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ABSTRACT

A longitudinal study described variations and changes in New Zealand children's cognitive, social, communicative, and problem-solving competencies from school entry at age 5 years and examined the impact of early childhood education experiences, family resources, home activities, and school resources on those competencies. This report, the third from the project, describes 8-year-olds' competencies, and compares the data with those gathered when children were 5 and 6. Data were gathered for 523 eight-year-olds, most from the Wellington region of New Zealand. One of the major findings of the study was that family resources were identified as the main factor associated with differences in children's competency levels, including family income, maternal education, and parental occupations. A considerable number of home experiences showed different patterns related to family income or maternal education. Early childhood education had enduring and concurrent effects on children's competency levels, with the age at program entry, family income, and program quality having an influence. Regular school attendance was particularly beneficial for children whose mothers had little formal education, and parental homework supervision was especially beneficial for children from low income homes. The report concludes that change to the socioeconomic differences inherited by the children would have the greatest impact on their competencies, and that the findings point to the importance of children using their knowledge and skills at home and in school and to the role of policies that support parental involvement in their children's education. Two appendices include further information on the principal component and factor analyses. (Contains 31 references.) (KB)

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COMPETENT CHILDREN AT 8
FAMILIES, EARLY EDUCATION, AND SCHOOLS

Cathy Wylie, Jean Thompson, Cathy Lythe

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FAMILIES, EARLY EDUCATION, AND SCHOOLS

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New Zealand Council for Educational Research
Wellington
1999

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EXECUTIVE SUMMARY

Competent Children is a longitudinal project with two main aims: to describe and analyse variations and changes in children's cognitive, social, communicative and problem-solving competencies from the time they begin school, at the age of 5; and to see what impact children's early childhood education experiences, family resources, home activities, and school resources have on these competencies. This is the third report from the project. It describes children's competencies at age 8, in the context of their lives, and compares the data for age 8 with the data gathered when the children were aged 5 and 6.

Data was gathered for 523 children at age 8. Most of these children lived in the Wellington region, which has a higher income profile than the rest of New Zealand. It is therefore likely that the study children's competency scores are somewhat higher than they might be for a national sample, since we continued to find that differences in children's scores reflect differences in family income.

Children's Progress between age 5 and age 8

Predictability

We found more consistency between children's scores at age 8 and their scores at age 6, than we had found between scores at age 5 and age 6. This was particularly marked for our competency measures for Literacy, Logical Problem-Solving, Perseverance, and Individual Responsibility.

We also found increased consistency between scores for different competencies than was evident in the first two phases of this study. Mathematics and Literacy, Communication, Perseverance, and Individual Responsibility now stand out as the cluster of competencies which provides the best indication of children's overall performance at age 8 (in the areas of competency included in this study).

Different patterns of progress

Children who were in the bottom and top quartiles of competency scores at age 5 were the most consistent in their performance over time. There were also signs of increased stability between ages 6 and 8 for children who were in the middle quartiles at age 8.

However we found quite marked differences in the patterns of children's progress over the first 3 years of school. These differences raise some important issues in relation to lowering the disparities in achievement between Māori and non-Māori, and between children from families with lower incomes or with low levels of maternal education, and children from families with higher incomes or high levels of maternal education.

At age 6, we found that the first year of school resulted in a marked closing of the gaps which we found at age 5 between Māori and Pakeha/European children, and between children whose English was a second language, and those for whom it was not.

By age 8, the gaps have opened again.

At age 8, for the first time, differences according to ethnicity remained after taking family income and maternal education into account. Māori children who started above the median at age 5 were more likely than Pakeha/European children to remain there for Mathematics and Logical Problem-Solving at age 6, but not at age 8. We found that compared with Pakeha/European children, Māori children who started below the median were more likely to remain there at age

8, and to make less progress between ages 5 and 6.

Similar patterns were found in relation to family income and maternal education. Children from families with low income or low maternal education showed a greater tendency to stay in the lowest quartile, and to move down out of the highest quartile, than other children. Children from these families who scored well at age 6 were less likely to still be scoring well (relative to other children) at age 8.

The gender differences we found at age 6 widened at age 8. In looking at progress between age 5 and 8, we found that boys showed more volatility than girls. But boys who started in the lowest quartile at age 5 were more likely than girls to remain there at age 8, and less likely to make up ground between ages 5 and 6. In the top quartile, more boys remained for Mathematics and Curiosity, but more girls for Communication and Writing.

Family Resources and Children's Experiences

We found that families with middle or high incomes are likely to be two-parent families, and, increasingly, to have two incomes. Mothers in these families are likely to have post-school qualifications. Children from these families have good health. These children are less unsettled than other children and more likely to cope if they are unsettled. They have access to computers, are likely to have their own desk, and their families get a daily newspaper, which can provide a window to the wider world. Children from these families are active outside school in clubs, playing music, and taking lessons outside school. Children from lower income homes have less access to these wider experiences, and thus may be more likely to rely on television as a source of experience and recreation.

By contrast, children in the low or lowest income brackets have experienced more changes in their families, and more shifts in homes. Though many have good health, this group is more likely to experience chronic health problems and need regular medication. Sole-parent families are much more likely to be in this income group simply because they have only one adult available for employment and also for childcare. The education levels of this group are generally lower, making it harder to find reasonably paid work. Unskilled workers — the low paid — also find themselves in this group. State benefits play a pivotal role in supporting the low paid, those who did not experience educational success, and families which can supply only one adult worker, usually a woman.

When the children were 5, 59 percent of the mothers were in paid employment. By the time the children were 8, 72 percent of the mothers were in paid employment, and most of those who were not would like to find jobs. The largest increase over the intervening three years was in full-time employment.

Twenty-seven percent of the children's parents had lost or changed partners in the 8 years since their birth. Twenty percent of the children did not live with their biological father, and 4 percent did not live with their biological mother. But most had regular contact with their non-resident parent, unless they were living in another town, and most were said by the resident parent to get on well with the non-resident parent. Overall, children's contact with their extended families had increased since age 5 and age 6.

Literacy and Mathematics Experiences outside school

By the age of 8, most children's use of literacy and mathematics did not stop at the classroom door, but had become part of their lives at home. The public library was a resource and experience for most children. Gender and family resource differences were apparent in relation to reading and writing, but not mathematics. Maternal education was more of a factor than family income in children's literacy and mathematics activities. Children were thought by their parents to enjoy reading most, followed by writing and mathematics. Measuring was less usual, and least enjoyed. There was little correlation between enjoyment of reading and writing, and family income.

School Experiences

At age 8, the majority of the children remained at the same school they started in. Only 6 percent of the children had less than good attendance, mainly due to illness. There was no pattern of persistent poor attendance between age 6 and age 8.

Changes of school were mainly due to the family changing house. Around a third of the changes of school made by parents were to find smaller classes, better discipline, or more individual attention. Private schools offered smaller classes, and children attending private schools were more likely to be at their second school. The median class size at age 8 for all schools in the study was 28 children, up slightly from the median class size of 26 at age 6.

Three-quarters of the children had teachers who had taught for more than 2 years. Most teachers continued their professional development through school-provided courses, and almost half were undertaking some relevant study on their own initiative.

Most children were positive about their classrooms. They perceived them as largely enjoyable, though not for every child in the class. Around half found their schoolwork demanding. Most children experienced some competition with others. A third of the children noted some fighting in their classrooms. Most children had some friends in their classroom, or felt that their classroom was a friendly environment.

Seventy-one percent of the children were reported by their parents to be enthusiastic about school, 13 percent to have mixed feelings, and 3 percent to be unhappy or bored. Enthusiasm was reported to be lower for the children whose parents were not satisfied with their progress, or who had mixed views. The main reason for parents' lack of satisfaction was their child's slower than expected progress at school. Other factors were class size, the child's boredom or lack of extension, discipline, and the quality of the teacher. Parents who were not satisfied or who had mixed views were more likely than satisfied parents to discuss their child's academic work with the child's teacher, but they were less likely to have regular contact with the child's teacher. The teachers were also more uncomfortable with the parents of children who were not doing so well in school than with satisfied parents.

The majority of parents were comfortable talking to their child's teacher. Those who were not had nevertheless all raised questions about their child's progress with the teacher. Sixty-five percent of the parents had worked with their child's teacher on problems encountered by the child—38 percent related to the child's happiness and social well-being, and 32 percent to their academic work.

There was less contact between parents and teachers at age 8 than at age 6. Parents whose children were doing well were more likely to have regular contact with the teacher.

Parents of boys were less satisfied with their progress, and more likely to work with the teacher to resolve academic problems. Boys were less likely to be reported as enthusiastic about school. Teachers also rated girls more highly on their overall progress. Girls were more likely to be seen by teachers as having strengths in literacy, music and art, and boys in mathematics, science, technology and physical education.

Factors which make a difference to children's competency levels

Family Resources

Family resources are the main factors associated with differences in children's competency levels. These include family income, maternal education, and parental occupations. The proportion of income available to a family after paying for housing is also significant. The level of these resources available to a child in their early years often had a larger association with children's competency levels than did current resource levels.

After taking family income into account, we find no associations remaining between children's competency levels and the source of family income, current family type, and family stability. However, we do find that family type compounded with lowest income levels over 3 years shows some disadvantages for children in sole-parent homes. This is an indication that what impacts most negatively on children's competency scores is continuing low income.

Maternal employment status, housing stability, and household size showed few associations with children's competency levels.

Children's Experiences and Activities

A considerable number of the home experiences we asked about showed different patterns related to family income or maternal education. Children in low income homes, whose mothers experienced little academic success, often have fewer experiences than others. But they also share in quite a range of those experiences, and enjoy their benefits. Activities such as reading the newspaper, using a public library, using mathematics in daily life, and using a computer, particularly graphics software, benefit children irrespective of family income—but they particularly benefit those from low income homes.

The pattern is less clear in relation to mother's education. Public library and computer use do not benefit children whose mothers have no educational qualifications, or no tertiary qualifications. This may reflect patterns of parental use of these resources, or parental confidence. For children to benefit in terms of the competencies we measured, parental education matters, not just the material resource. This points to the importance of involving parents with little education *in* education, with a joint focus on child and parent alike.

The amount of television watched by children also has a bearing on their competency levels, particularly for Literacy and Mathematics. Children who watched an hour or less on average at age 8 had higher scores than others. Earlier television watching habits at age 5 continued to have an impact at age 8. Few children who watched television for more than 3 hours at age 5 had reduced their television watching at age 8, suggesting that earlier habits are hard to shift.

Children's competency levels were also related to some parental activities, particularly the amount of time parents watched television themselves, and the support they gave children with their homework.

Children who enjoyed reading and writing had higher scores than others on a number of the competencies.

Early Childhood Education

Early childhood education experiences have enduring as well as concurrent effects on children's competency levels. The positive benefits remained evident in the children's competency levels 3 years after they had left early childhood education to go on to school. Children who started early childhood education before the age of 2 had higher scores, irrespective of the level of family income, though somewhat diluted after taking maternal education into account. Children with more than 4 years early childhood education experience scored higher than others, after taking family income into account, with some dilution after taking maternal education into account. Low income children with more than 4 years early childhood education experience achieved as well as high income children with the same length of early childhood education experience for Literacy and Communication.

The socioeconomic mix of a child's last early childhood education centre continues to show a relationship with Mathematics and Logical Problem-Solving after taking family income into account, showing an advantage for children who had attended a centre serving mainly middle-class children compared to those who attended centres serving mainly low-income children.

Quality of the child's last early childhood education centre continued to have a bearing on children's competencies at age 8, with these factors being particularly notable:

- staff are responsive to children
- staff join children in their play
- staff model/guide children in the context of centre activities
- staff model and encourage children to use positive reinforcement, explanation and encouragement for behaviour
- staff ask children open-ended questions that encourage children to choose their own answer
- children can select their own activities from a variety of learning areas
- children are allowed to complete activities
- the centre is a "print-saturated" environment
- stories are told
- there are enough age appropriate resources for children to use without having to wait, compete, or fight for scarce resources.

School

Regular school attendance was particularly beneficial for children whose mothers had little formal education, and parental supervision of homework was particularly beneficial for children from low income homes.

Voluntary parental involvement with the school also made a difference, in contrast to the lack of association between parental involvement in early childhood education and children's competency levels. Perhaps parental involvement at the school level becomes more important because the more structured nature of school calls on greater perseverance, commitment and creation of "product", which parental involvement with the school shows a child is something to be valued.

We found that the socioeconomic composition of a school does make an additional contribution to children's Literacy, Mathematics and Logical Problem-Solving competency levels, over and above their individual family income. Taking children's age-5 scores into account showed the school decile attended by children to have an influence of its own for Literacy and Logical Problem-Solving. This influence results in lower scores for children attending decile 1–2 schools.

Our data on children's experiences of their classrooms underscore the negative impacts of friction between children, competitiveness, the difficulty of the work, and lack of satisfaction or enjoyment. However, children don't need to be friends with everyone in the class, as long as they have some friends.

Making a Difference out of the Differences

Our hope in this study is to extend and deepen our understanding of children's development, and the role that different resources and experiences play. We also hope that by improving our understanding, some promising directions can be identified for those who are keen to improve children's competency levels, and to minimize the gaps between children in different circumstances.

Change to the socioeconomic differences inherited by children would have the most impact. Such a change would be likely to take place over a time-span in which the children in this study are adults (and parents) themselves, and if there is a continual willingness of government and other economic and social players to tackle the issues related to New Zealand's uneven distribution of income, employment, housing, and education.

In the short-term, the findings in this study point to the importance of children being active, extending their knowledge and skills through using them—in the home as much as in school. Policies which support parental involvement in their children's learning, particularly parents whose own education was minimal, are likely to yield benefits for adults as well as children. Public libraries, early childhood education centres and schools may be key places to bring parents and children together in enjoyable and stretching activities, as well as being key places to extend children's experiences.

Making this effort may be particularly important in the first few years of school—not just the first year, but in the following years.

Good relations between children and their teachers and adults which provide support, guidance, and respect, is one key to children's positive engagement with challenge.

Enjoyment is another key to children's engagement in activity and learning. Enjoyment is related to some of the aspects of early childhood education which we find continued to make a difference for children's competency levels three years after they had left early childhood education. These aspects of quality include variety, the opportunity to choose or initiate, and the opportunity to complete projects or activities.

OUTLINE OF THE COMPETENT CHILDREN PROJECT

Figure 1

Competent Children Project Outline

Year	Main Study	Survey	Schema Study
1992	**Pilot Study**		
1993–94	PHASE I **Fieldwork**–near 5-year-olds 307 children and parents 87 ECSs 6 Instruments **Reports:** Competency, quality frequencies reported to Ministry of Education; study participants (seminars and posted summary) **Pilot study**–6-year olds 16 children 10 schools	**Fieldwork**–near 5-year-olds 767 children 56 ECSs 2 instruments (parent, ECS) Initial ECS usage, school choice, and tertiary saving reported to Ministry of Education	**Fieldwork**–near 5-year-olds 18 children (in main study also) 4 ECSs 6 instruments (as in main study) and Samples and Records (child, parent, ECS)
1995–96	PHASE II **Fieldwork**–6-year-olds 298 children 121 schools 330 teachers 3 instruments **Conference papers:** – Early Childhood Education Quality, Family Resources, and Children's Competencies at age 5. – Early Childhood Education Services: What Works for Parents?	Brief postal contract with parent/caregivers. Consents renewed	**Book:** *Thinking Children*
1996	**Report:** Competent Children at 5 **Handbook** for parents and practitioners: Five Years Old and Competent. **Conference paper:** Between 5&6: What happens to the impact of Early Childhood Education Quality and Experience on Children's Competencies?		
1996–97	PHASE III **Fieldwork**–8-year-olds 523 children 168 schools 547 teachers 3 instruments	242 children incorporated into main study **Report:** Spreading Their Wings	
1998	**Report:** Competent Children at 6		
1998–99	PHASE IV **Fieldwork**–10-year-olds		
1999	**Report:** Competent Children at 8		
2000	**Report:** Competent Children at 10		
If funding continues:			
2000–1	Phase V Fieldwork–12-year-olds		
2002–3	Phase VI Fieldwork–14-year-olds		
2004–5	Phase VII Fieldwork–16-year-olds		

CHAPTER 1

INTRODUCTION

Background to the Study

The Competent Children project[1] is designed to focus on the contributions which early childhood education, school resources, family resources, and children's activities make to the development of New Zealand children's competencies. We hope to enlarge our understanding of children's progress and the factors which affect it, and provide knowledge and insight which can be picked up by parents, teachers, and policymakers in order to make a positive difference for children.

We use the word competency to refer to combinations of knowledge, skill, and, sometimes, attitude, which can be seen at work in everyday practice, or gauged through specific tasks.

We explore 10 realms of competency in this study. They cover:

Literacy, Mathematics, Logical Problem-Solving,
Communication, Curiosity, Perseverance,
Social Skills with Peers, Social Skills with Adults, Individual Responsibility,
Fine Motor Skills.

This set of competencies by no means exhausts the spectrum of capabilities which are valued in New Zealand. It does provide a reasonably comprehensive grasp of competencies which have been linked with successful learning (in a society which is putting more emphasis than previously on the role of education and learning in relation to employment), and with satisfying social and economic participation.

Having such a range of competencies also allows us to see how usual it is for one individual to be competent in all of them, and, as we follow the study children over the years, to see whether patterns of achievement and prowess over time are different for different competencies.

Methodology

First phase - at age 5

Our data-gathering began in 1993–1994, when the 307 children then in the study were almost 5 years old, and were still attending early childhood education. The children's teachers rated them for the competencies which required a more extensive knowledge of the child than a researcher could gain quickly. The children themselves carried out research tasks related to the other competencies. We also gathered material about the quality of the early childhood education services attended by the children, and observed their activities there. We spoke with parents about the family, the child's activities at home, their history of early childhood education from birth, the parents' perceptions of their child's first and final early childhood education services, and their choice of school for the child.

We reported the results of this first phase in *Competent Children at 5: Families and Early*

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[1] The project has been funded by the Ministry of Education, and NZCER.
Figure 1 opposite sets out the work undertaken so far, and the resulting reports.

Education, published in 1996. We found that the length and quality of early childhood education did make a positive difference in relation to children's competency levels. Family resources and children's home activities were also important. Level of family income was particularly important. It overrode several of the associations initially found between children's competencies and a number of other factors, such as ethnicity and family type.

Second phase - at age 6

In 1995–96 we returned to 298 of the study children, a year after they started school. They were at 121 schools.

Parents told us about their child's transition to school, parents' satisfaction with initial school progress, the child's home activities, family activities and resources, and the parents' proposed choice of secondary school. Teachers gave us information relating to class size, each child's overall progress, and the teacher's contact with the child's parents. Teachers also rated 6 of the 10 competencies. We gave each child tasks to do for the other 4 competencies, and also asked them about their approach to difficulties encountered in the course of school work.

We reported the results of this second phase in *Competent Children at 6: Families, Early Education, and Schools,* published in 1998. We found that the length and quality of early childhood education continued to make a positive difference in relation to children's competency levels. There was continuity too for the impact of family resources, and also children's home activities. Prior resource levels and activities sometimes had more weight than current ones.

Current phase - at age 8

The sample

Most of the 298 children who took part in the study at age 5 and age 6 continued to participate at age 8. Six parents declined their consent, 9 families were now living overseas, and one family could not be contacted. One child was a special needs child who did not take part in many aspects of the third phase. This left 281 main study participants.

We decided to increase the size of our sample to 520 children to allow for attrition as the project progressed over time, particularly of children from low income families. Our main study families had, on average, higher incomes. Pakeha/European families were also over-represented. To some extent, this reflects the nature of the Wellington area compared with the country overall.

The main study sample was increased to 523 children by incorporating 242 children who had turned 5 in late 1993–mid 1994. These children's families had taken part in a related telephone survey of 767 Wellington and Porirua families which included information about their early childhood education history and family resources.[2] The sample selected from the survey was weighted towards low income/non-Pakeha families. A random sample was taken of the balance of those survey families available for selection. The final sample included 36 children from families in the high income bracket, 69 from families in the middle income bracket, and 137 from families in the low and lowest income bracket.[3]This enabled us to obtain sufficient numbers of children

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[2] The survey results are reported in Lythe (1997).

[3] High income = $60, 000 and above per anum; middle income = $30–60,000; Low income = $20–30,000, and Lowest income = $20,000 or less.

children showed that while the survey families had slightly higher incomes overall, the differences between the two groups were not statistically significant. Ethnic identity and maternal qualifications were similar for both sets. There were slightly more sole parents in the main study group, but the same proportion, 15 percent, in each sample. These similarities gave us confidence that we could merge the two groups for our analysis of the material gathered at the age 8 phase.

Fieldwork began in November 1996 and continued until October 1997, timed as closely as possible to each child's eighth birthday. The average age when children were interviewed was 8 years 1 month. The sample children attended 168 schools.

The two project coordinators maintained continuous quality checks of 10 percent of all incoming work and stayed in touch with fieldworkers through telephone calls, memoranda, and meetings with individual researchers.

We interviewed parents, teachers, and the children themselves[4]. Parents told us about their child's attitude to school, parental satisfaction with their child's progress, their own involvement in the school and their contact with their child's teacher, changes in the child's life, the child's health, any problems, and home activities. We also asked parents about their own interests, including reading and TV preferences, family activities and resources, including employment and income, and their proposed choice of secondary school for their child.[5]

Teachers gave us information relating to each child's class, including class size, kind of class (composite or single level, single cell or open plan), the stability of the class, and whether or not they used multiple choice tests (such as the ones we used to assess children's competencies at age 8). We also asked teachers about their own length of teaching experience, qualifications and continuing professional development. They told us about each child's progress, and the teacher's contact with the child's parents.

The children told us what they liked doing at home, their favourite TV programmes, reading at home and use of the public library, how they used a computer at home, if they had one, and how they solved problems encountered in their school work and with their peers. We used the *My Class Inventory* (Fisher, Fraser, and Bassett 1995) to get some idea of children's experience of their classroom.

We have a number of different reasons for including the experiences, resources, and activities we analyse in this study. We are interested in seeing whether the factors which are at work in what happens for New Zealand children in the 1990s are similar to those which have been found at work in other countries, or in earlier New Zealand studies. We are also interested in seeing how home and educational experiences relate to one another, and how home resources relate to home activities. Another main reason is to see what weight factors which are thought to be important for children's education do in fact have on their competency levels, and to see whether some factors have more weight than others.

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[4] Ninety-one percent of the parents who took part in our interviews were mothers, 7 percent were fathers, and 1 percent of the interviews were done with both parents. Six of the respondents were other relatives of the child.

[5] The 3 research instruments used are published separately as *Competent Children at 8 - Research Instruments*, available from NZCER.

Measuring the Competencies

As at ages 5 and 6, we asked the children's classroom teachers to rate them on the 6 competencies which needed to be assessed by someone who had experience of the child over time. We asked the children to undertake a set of tasks related to the competencies of Literacy, Mathematics, Logical Problem-Solving, and Motor Skills.

We used much the same set of assessments at age 5 and age 6.[6] At age 8, we needed to switch to some new assessments to take account of the children's development, the longer gap of two years in our data-collection, and the availability of some standardised tests[7] for the 8 year old age-group which we could repeat if we returned to the children at a later age. We were able to keep most of the assessments we used for the teacher-rated competencies, with some extensions.

Teacher-rated Competencies

Communication, Curiosity, Perseverance,
Social Skills with Adults, Social Skills with Peers, Individual Responsibility

These 6 competencies are the ones most appropriately assessed over a period of time, by adults close to the children. The teachers had taught the individual children for an average of 6 months. The shortest period was 1 month (1 percent), and the longest 3 years (1 percent). The average age of the children when their teachers were interviewed was 8 years, 1 month.

Teachers rated children by matching a set of statements related to each competency area to the child, using a 5 point scale which we then converted to a numerical rating: always (5); often (4); sometimes (3); hardly ever (2); never (1).[8]

The 9 statements we used to assess the children's Communication remained unchanged. The other competency measures had items added to suit the larger amount of classroom work children did on their own. We added the item "does (name of child)finish all his/her work?" to the Perseverance measure. Two items were added to the Individual Responsibility measure: "Does (name of child) act without thinking?", and "Can (name of child) get on with his/her schoolwork without distraction?".

We also drew on other research on children's social skills, particularly the Canterbury Social Development scale (Church and Langley n.d.). The measure which changed most was Social Skills with Peers, where we changed questions which focused on playing with other children, and asked instead about "Is s/he led astray by peer pressure?", "Is s/he good at making and keeping friendships?", and "Does s/he lose her temper with other children?".

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[6] See the earlier reports, *Competent Children at 5* and *Competent Children at 6*, for details.

[7] A standardised test is a test which has been trialled with a representative sample of children (or adults). This trialling provides the range of scores which were achieved, and allows comparison of the test scores with the average scores achieved in the trial for a given age, or group. These benchmark scores are also called norms.

[8] The scale was reversed for the few negative items.

Task-assessed Competencies

Literacy

At age 6, we used the Burt Word Reading test, a test standardised for New Zealand children in 1980, and Tunmer's Invented Spelling measure. At age 8, we continued to use the Burt Word Reading test, and we also moved onto another standardised test, the PAT[9] Reading Comprehension test. This test is already done by many schools, usually in the first six months of the year, with whole classes, rather than individually, around the child's birthday, as the rest of our assessments were done. We did the test ourselves with children at schools which did not use it. Ideally, we would have used both PAT reading tests, Reading Comprehension and Reading Vocabulary, but this would have taken too much time.

We also asked the teachers to give us their estimate of each child's reading age.

Cedric Croft of NZCER helped us devise a *writing* test, the Expressive Writing Task (with Weighted Marking Criteria).The children were asked to write 10–15 lines about one of their favourite books or TV programmes: What happened in it? What did they like most about it? This is a non-fiction topic, which would not favour girls above boys. Marks were given for the surface features of spelling, punctuation, grammar and syntax, for the deep features of vocabulary choice, progression of the description of what happened in the book or TV programme, and originality of thought, and for task completion.[10]

Mathematics

Our base for the assessments at ages 5 and 6 was Jenny Young-Loveridge's SENS instrument. This instrument had been used in her study of children's mathematical progress up to age 9.[11] However, there were few common items between age 6 and age 8, and the test did not provide sufficient discrimination for our purposes at age 8, since most of her study children got many items correct. At age 8, we moved to the standardised PAT for Mathematics. Time precluded our using all of the 54 items in this test. Neil Reid, who originally devised this test, gave us a reduced set of 20 items which would provide a reliable test for research purposes. These items were the ones which were around the median of the 100 items in their level of difficulty, and in their power to differentiate between children (high scorers overall were correct on the items, and low scorers were incorrect).

Logical Problem-Solving

At ages 5 and 6 we used a set of items from Raven's Coloured Progressive Matrices which we trialled beforehand to ensure that we chose items which gave good discrimination, and high correlation between scores on different items (those who scored highly on one item were likely to score highly on others too). At age 8, the children were old enough to do Raven's Standard Progressive Matrices, which had been normed for New Zealand children aged 8 to 16 in 1984. Our administration of this test was done with an eye for the overall length of the interview we had with the children. We put a time-limit of 20 minutes on this test.

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[9] Progressive Achievement Tests of Reading (NZCER)

[10] All the writing tasks were marked by 2 researchers.

[11] Young-Loveridge (1991)

Fine Motor Skills

Here too we could move to a standardised test. The Bruininks-Oseretsky Test of Motor Proficiency can be used into adulthood, and covers a full range of motor skills. It has been standardised for the United States, but not New Zealand.

We used only the subtest for Visual-Motor Control. This covers the same sorts of skills we assessed at age 5 and age 6—cutting and drawing—but also includes copying freehand, instead of the tracing task we had used. This sub-test had a good correlation or match with the whole fine motor skills subset of this test (r=0.77), showing that children's scores on this sub-test were a reasonable indication of their scores on the whole test.

Children's Attitude to Being Interviewed and Completing Tasks

Most children were comfortable with being interviewed by someone they did not know well or who was in fact a stranger to them. Just over half the children interviewed were described by the researchers as confident when being interviewed and in handling the range of tasks presented to them (53 percent). Children were also described as being matter of fact (23 percent), quick (19 percent) or even too quick (5 percent).[12] Fifteen percent were described as either being afraid of getting things wrong, or seeking constant reassurance that they were doing the right thing, and 13 percent were described as being withdrawn and shy. Some were said to be restless (9 percent), or seeming not to understand what to do with the task (5 percent) or simply unwilling to try (1 percent).

The description 'confident' was linked to family income, ethnicity, mothers' education and the child's gender. This may of course reflect the interaction of individual researchers with children as much as their perception of the children. The perception that children were confident in their approach to our tasks rose in proportion to the level of family income. Sixty-three percent of children from families in the highest income bracket were described as confident, compared with 51 percent of children from families in the middle income bracket, 43 percent from families in the low income bracket and 35 percent from families in the lowest income bracket. Pakeha/European children were somewhat more likely to be described as confident than Māori or Pacific Island children (55 percent, compared with 39 percent of Māori children and 36 percent of Pacific Island children).

Children of mothers with no qualifications were least likely to be described as confident (27 percent compared with 50 percent of children whose mothers had mid-school qualifications, 59 percent of children whose mothers had trade qualifications, 57 percent of children whose mothers had tertiary qualifications and 63 percent of children whose mothers had university qualifications). Girls were somewhat more likely to be described as confident than boys (61 percent compared with 42 percent).

More children from sole parent families were described as restless (16 percent, compared with 8 percent of children from two-parent households). Being described as restless was also associated with the level of family income, mother's education and the child's gender, but there were no associations with the child's ethnic background. Five percent of children from the highest income group were described as restless, compared with 11 percent of children from families in the middle income bracket, and 16 percent from families in the low income bracket. If their mother had no qualification children were more likely to be described as restless than children whose mother had a university qualification (18 percent compared with 6 percent).

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[12] The descriptive categories were not mutually exclusive. For example, some children described as confident could also be described as quick, or too quick.

Analysing the Data

In this report we provide a description of the children and their experiences, and the main results of our statistical analysis. We have endeavoured to report our analysis in non-technical language, so that these results will be accessible to a wide audience. However, some technical language is necessary. We outline below the main forms of analysis which are used in this report, and our approach to the data.

Analysing the Competency Scores

In this report, the scores for the tasks or ratings making up each competency measure have been added and converted to a percentage. The *median* gives the "half-way" score: half the children scored above this, and half below. *Upper quartile group* refers to the top 25 percent of scores, and *lower quartile group* to the lowest 25 percent of scores.

We then looked at how well individual children's scores on one item within a particular competency measure matched their score on other items, how well their score on one competency measure matched their scores on other competency measures, and how well their scores at age 8 matched their scores at ages 5 and 6. We wanted to see whether the relationship between the scores was a *linear relationship.* Where there is a linear relationship, an increase or decrease in one score would be matched by an increase or decrease in the score being compared with it.

Correlation

Linear relationships are measured by looking at the *correlations* between two variables – in this case, the two scores. The correlations indicate the amount of the spread of scores around the linear relationship between the two scores.

We worked out the correlations by using a measure called the *correlation co-efficient.* This measures the strength of the linear relationship by taking into account the variation **within** each of the two variables being compared, as well as the variation **between** the two variables. This is reported as r. When r = 1, there is the strongest possible relationship – that is, the two variables relate perfectly. When r = 0, there is no linear relationship between the two variables. A correlation of below about 0.30 suggests that there is almost no linear relationship between the variables being compared.

For example, we found a correlation of r = 0.78 between children's Literacy scores at age 6 and at age 8. This is a high correlation in social research. By contrast, the correlation between their scores for Social Skills with Peers at age 6 and age 8 was only r = 0.30.

Analysing Factors Relating to Children's Experiences

We used simple *cross-tabulation* to see what associations exist between different aspects of children's resources and experience—for example, between family income and receiving a newspaper. Cross-tabulation can tell us whether the proportions of the groups of parents with low and high incomes receiving a daily newspaper are the same. In this example, our analysis showed us that 65 percent of high income families received a newspaper, declining to 26 percent of the lowest income families. The difference between these proportions suggested that receipt of a newspaper was dependent on family income.

Probability

We then tested this association, and all the others we found, to see how strong they really were. To do this, we measured how likely or probable it was that each association was occurring merely by chance. This is reported as p.

In our description of children's experiences, we report those associations which have a probability of occurring by chance of no more than 1 in 20 ($p = 0.05$). We also report some of the associations with a slightly higher probability of occurring by chance, where these associations are consistent with other findings.

Analysing Associations Between Competency Scores and Factors Relating to Children's Experiences at Home, School, and Early Childhood Education

The analytical approach used in this study is one of exploration. Exploratory Data Analysis (EDA) has been used extensively, along with modelling of competency measures by child and education related attributes (factors), in order to identify and describe the significant inter-relationships between the child's educational progress and the world around them. The richer the description of related factors, the better the understanding of the circumstances associated with certain levels of performance.

We are not primarily engaged in a contest to find "the best" factors. We believe that first, this takes us no closer to understanding what may be done to enhance performance; and secondly, the process is fraught with likelihoods that real effects will be obscured. A broad description of the kinds of things that appear to help and the kinds of things that appear to hinder educational achievement is likely to be much more helpful.

Our exploratory statistical approach differs from methods of developing and fitting predictive models, such as stepwise multiple regression. One aim of stepwise regression is to find the set of factors which appear in sequence to associate most closely with a given outcome, and hence may be used as predictors. These are commonly interpreted as the *most important* factors. While they may reasonably be interpreted as the most important *predictive* factors, it does not mean that they might be the most important *driving* factors. It is the driving factors which we are primarily interested in.

Such models also often obscure closely linked factors which may well, despite their smaller contribution to a predictor in a strictly statistical sense, have very important social implications. Indeed, this situation is *rather likely* to occur in a social science setting, where there are usually correlated (overlapping) factors (e.g. family income, parental education, and parental occupations).

Techniques which work best in a situation of independent factors are likely to give misleading results in the complex social environment. However, where our EDA analysis does point the way to sets of relatively independent factors which can be used for predictive modelling, we have used them in this way.

One-Factor Modelling

We tested any differences we found in the average scores of groups of children with different factors, or different amounts of a factor such as income, in their lives. This enabled us to see whether the differences could be partly due to the specific factor we were looking at. This is called *one-factor modelling.* It shows how probable it is that the association seen between differences in scores and differences in that factor has occurred merely by chance.

In our analysis, only those associations which have a probability of occurring by chance of less than 1 in 100 are reported as *significant.* Where the probability of the associations occurring by chance is between 1 and 5 in 100, they are reported as *indicative.* However, in many such cases we are confident that the associations would be significant if our sample had been larger, especially where other evidence points to the same thing. It must be remembered that the statistical relationships found identify associations, but not necessarily causes.

Table 1 below gives an example. It shows that 8 year old children who were reading library books at age 6 have higher average scores on all the competencies than 8 year old children who were not. The probability that the relationship between reading library books and teachers' perceptions of children's reading ages occurred by chance is a tiny p=0.0.000000000060. But the probability that the relationship between reading library books at age 6 and levels of Social Skills with Peers (p=0.014) has arisen by chance, and would be unlikely to be found in another similar sample, is much higher, close to 1 in 100. Both of these fit into our category *significant.* Three of the associations with reading library books at age 6 have a 5 in a 100 chance of occurring by chance (Curiosity, Fine Motor Skills, and Logical Problem-Solving). These fit into our *indicative* category. There are no associations in this table with more than a 5 in 100 chance of occurring by chance, so all the associations between reading library books at age 6 and children's competency levels at age 8 are either significant or indicative.

Table 1

Reading Library Books at age 6 and Children's Competencies at Age 8

Child Read Library Books at age 6→ Competency↓	**Reads library books n=222**	**Does not read library books n=59**	**Probability**
Curiosity	**63.8**	*59.1*	0.058
Perseverance	**69.4**	*56.5*	**0.000028**
Individual Responsibility	**70.2**	*57.2*	**0.0000063**
Social Skills with Peers	**67.1**	*62.6*	**0.0069**
Social Skills with Adults	**74.1**	*68.3*	**0.014**
Communication	**71.6**	*65.1*	**0.0025**
Mathematics	**66.9**	*49.2*	**0.000000027**
Fine Motor Skills	**85.5**	*82.1*	0.042
Literacy			
PAT Reading Score	**43.5**	*27.2*	**0.00000040**
Burt Word Reading Test	**49.5**	*37.5*	**0.00000065**
Writing Score	**62.6**	*52.0*	**0.000016**
Teacher Perception of Reading Age	**9.5–10yrs**	*8–8.5yrs*	**0.000000000060**
Logical Problem-Solving	**49.0**	*44.7*	0.041
Composite Competency[13]	**66.1**	*57.4*	**0.00000020**
Composite Cognitive Competency[14]	**56.3**	*44.6*	**0.000000015**

The highest scores for each competency are in **bold** type, the lowest in *italics*.

In the probability column, Significant associations are in bold, and indicative associations in ordinary type.

Two-Factor Modelling

Where we found significant or indicative associations between a competency and a given factor relating to children's experiences and resources, we often introduced another factor into the model to see which was the more important. This was usually family income, because we had found in our earlier reports that family income showed powerful associations with a broad range of competencies, and that a number of the apparent associations shown by one-factor modelling were no longer there after we took family income into account as a factor underlying or explaining the difference. In other words, family income could be considered to be the main factor behind the apparent differences.

In the example above, we found that library book reading continued to make a difference to children's scores for Mathematics, Communication, Social Skills with Adults, the Literacy measures, and Logical Problem-Solving even after we took differences in family income into account. However, when we included family income in our modelling of the differences in scores related to differences in family type, these differences disappeared. In this case, the two-factor modelling showed that family income, not family type, was the dominant factor which was in fact associated with the differences in scores.

We have done all our two-factor modelling twice, so that each of the two factors we were looking at could be entered first, since the order in which factors are entered can make a difference to whether one factor seems more strongly associated with a competency than the other.[15]

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[13] The composite competency is the average of the sum of all the competencies, splitting Literacy into reading and writing, and omitting teacher perception of reading age. The score for Literacy (reading) gives equal weight to the PAT reading comprehension test score and Burt Word Reading test score.

[14] This is the average of the sum of scores for Mathematics, Logical Problem-Solving, Literacy (Reading), and Literacy (Writing).

In this study our analysis has also explored what we call interactions between pairs of factors.This is an important element. It is based on allowing the possibility that "circumstances alter cases" (J M Barrie). In essence, we explore the possibility that effects associated with one factor may differ across the levels of a second factor; that is, there may be some interaction between factors so that the associations are different for different groups of children within the factor. We report, for example, that the advantage of using a public library is particularly marked for children from low income families.

The report begins with a picture of the children's competencies at age 8, and an analysis of their progress over time (Chapter 2). We follow with a descriptive section looking at the children's home resources, their activities, and their school life (Chapters 3 - 6). In section II we move to the one-factor and two-factor analyses of the roles which these different factors in children's lives play in their competencies at age 8 (Chapters 7-11), before concluding with an analysis of the key factors in children's lives and experiences which contribute to their competency levels at age 8, and a brief finale which focuses on the implications of our findings (Chapters 12 and 13).

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[15] Many statistical packages set up to make such choices will try the factors in the model and then declare which one is more important, but as stated above the actual differences in contribution may be very small and making a choice may actually obscure an important area where sociological and policy action is possible. Furthermore, many packages ignore the fundamental complexity of a factor structure and so may produce an incorrect result when they require factors to be coerced into variables to enable their use in regression.

THE CHILDREN'S COMPETENCIES

Individual Competency Levels

In this section, we look at the scores for each of the competencies in turn. The results show what could be expected of New Zealand 8 year olds. However, it should be noted that our sample has more children from high income homes than the country as a whole. As we found family income to be strongly related to children's competency levels at ages 5 and 6, our sample's competency levels are likely to represent a higher level of performance than would be found with a nationally representative sample.

Next we look at how well children score across the range of competency measures, to see if a child's score on one competency measure is a good guide to how well they are likely to score on the other competency measures.

The scores of the original children in the study, and those who joined at age 8 from the survey, were compared to see if we could amalgamate them and report them together, and to see if the comparison with the original study children's scores at age 5 and 6 would be valid. The two groups were found to be very similar in their distributions for all the competencies. Therefore all the children's scores are reported together in the descriptions which follow, unless otherwise indicated. Where we mention children's scores at age 5 and age 6, these refer to the scores for the original children in the study.

For the children who have been in the study since age 5, we then go on to compare scores at age 8 with scores at ages 5 and 6, explore some of the reasons for the different patterns of progress in different competencies, and look at how well the 5 and 6 year old scores on a particular competency predicted the 8 year old scores on the same competency, and on other competencies.

Teacher-rated Competencies

Communication, Curiosity, Perseverance,
Social Skills with Adults, Social Skills with Peers, Individual Responsibility

We used teacher ratings based on their experience of each child. We look first at scores on the individual items used to measure each competency. In our discussion of the each competency, we focus mainly on those items where more children scored at the top end of the scale (5 = highest, 1 = lowest), and those items where more children scored at the lowest end of the scale.

We then look at how well a child's score on one item matched their score on another item. This is called the correlation. If each child in the study had the same individual score on each of the 2 items being compared, that would give a correlation of 1 (written as r = 1). This would be the strongest possible correlation. A correlation of below 0.3 means that there is almost no linear relationship in the scores on the 2 items being compared.

Communication

Most teachers thought that the speech of the children in the study was easily understood, even by strangers. The children usually understood stories read to their class. As at ages 5 and 6, scores were lowest for the items "experiments with language", "varies speech to get ideas across", and "asks for something not understood to be repeated or explained again". At age 8, children also scored low for the item "gives clear explanations or descriptions". The overall median rating[16] for Communication at age 8 was 72 percent. This is the same median achieved by the original study children when they were 6. At age 5, the median for the original study children was 78 percent.

The range of matches or correlations between the items making up the Communication measure was from r=0.27 to r=0.68, with a median of r=0.45. This is a higher range of correlations than at ages 5 and 6, but with a similar median. This wide range of correlations indicates that children who are good at one aspect may not be good at every aspect of communication. The strongest correlations show that children who scored highly on following a conversation and staying on a topic or who were accurate in passing on messages were also likely to score highly on being able to remember and carry out simple instructions. The converse did not hold true: a high score on remembering and carrying out simple instructions was not always followed by a high score on accuracy in conversations and messages.

Table 2

Communication at Age 8 (N=523)

Rating →	5	4	3	2	1
Item ↓	%	%	%	%	%
Receptive					
Can remember and carry out instructions after hearing them once	15	48	23	10	2
Asks for something not understood to be repeated or explained again	19	37	25	16	3
Follows conversation and stays on same topic	29	46	16	7	0
Usually understands stories read to class	49	42	7	2	0
Passes on messages accurately	33	41	17	7	2
Expressive					
Speech easily understood even by strangers	54	35	9	2	0
Varies speech to get ideas across	15	35	32	15	3
Experiments with language	5	33	38	21	4
Gives clear explanations or descriptions	18	44	26	11	1

5=always, 4= often, 3=sometimes, 2=occasionally, 1=never.

Curiosity

The item on which children scored most highly was "takes an active interest in his/her surroundings". The two low scoring items were "likes to put things together/take them apart" and "asks a lot of questions, or wants to know how and why". There was little change between ages 5, 6, and 8 over the item "enjoys new experiences and challenges".

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[16] We obtained the overall median rating for each competency by adding the scores for each item in a given competency and standardising to give a percentage, so that we could compare scores across the different competencies included in the study.

The overall median score for Curiosity was 63 percent, the same median as for the original study children at age 6, compared with 69 percent at age 5 for the original study children.

Looking at the individual scores of children on the 4 items measuring Curiosity at age 8, we found the strongest associations were with the item "Takes an active interest in his/her surroundings". Children who asked a lot of questions are reasonably likely to score highly on this item (r=0.52); but children who do not ask many questions have both low and high scores for their interest in their surroundings. Enjoying new experiences and challenges also has a reasonable correlation (r=0.52) with taking an active interest in the surroundings.

Table 3

Curiosity at Age 8 (N=523)

Rating → Item ↓	5# %	4 %	3 %	2 %	1 %
Asks a lot of questions/wants to know how and why	11	36	33	18	2
Enjoys new experiences/challenges	16	44	33	7	0
Likes to put things together/take them apart	8	34	36	17	5
Takes an active interest in surroundings	24	44	24	7	1

# 5=always, 4= often, 3=sometimes, 2=occasionally, 1=never.

Perseverance

Many of the children had a good concentration span when working on things of interest to them, and many also finished all their work (a new item).

The median score for Perseverance was 69, the same as at ages 5 and 6 for the original study children. The correlations between the items ranged from r=0.56 to r=0.72, with half at r=0.58. The correlations between the items for our measure of Perseverance have increased since age 6, indicating a growing consolidation of performance on different aspects of persistent behaviour. The highest correlation was between "always finishes his or her work", and "has a good concentration span on things of interest".

Table 4

Perseverance at Age 8 (N=523).

Rating → Item ↓	5 %	4 %	3 %	2 %	1 %
Finishes all work	32	33	21	12	2
Persists when encountering problem in doing something creative	14	38	29	17	2
Good concentration span when working on things of interests	35	38	18	7	1
Makes an effort even when unconfident	14	35	28	20	4

# 5=always, 4= often, 3=sometimes, 2=occasionally, 1=never.

Social Skills with Adults

Almost all the children showed respect for their teachers. Many children were also confident in their dealings with the teacher and other adults in the school. The median score here was 75 percent, the same at both age 5 and 6 for the original study children. The spread of scores was closer to that at age 6 than at age 5.

The correlations between the items in our measure of Social Skills with Adults had a wide range, from r=0.20 to r=0.60. This indicates that a child can be much better in one aspect of relating to adults in the school than others. One item was reasonably correlated (r=0.42 to r=0.45) with the other three: "presents her/his point of view to a teacher in an appropriate manner, even when there's a disagreement". This indicates that a child who scores well on this item would also be likely to have other skills in dealing with adults. The highest correlation was between confidence in interactions with adults, and asking teachers for help or information when needed.

Table 5

Social Skills with Adults at Age 8 (N=523)

Rating → **Item ↓**	5 %	4 %	3 %	2 %	1 %
Confident interactions with adults in the school	24	42	22	11	1
Asks teachers for help or information when needs it	21	41	27	10	1
Shows respect for teachers	58	30	9	3	0
Can present own point of view to teacher in appropriate manner, even when disagreement	25	39	23	11	2

# 5=always, 4= often, 3=sometimes, 2=occasionally, 1=never.

Social Skills with Peers

Few children often lost their temper when working with others (3 percent), or were led astray by peer pressure (14 percent). Most children were good at making and keeping friendships. But relatively few children could work with other children over an extended period of time without needing adult intervention (12 percent).

Table 6

Social Skills with Peers at Age 8 (N=523)

Rating → **Item ↓**	5 %	4 %	3 %	2 %	1 %
Works with other children over extended period of time without needing adult intervention	12	42	28	15	3
Loses temper with other children*	49	32	15	3	0
Good at making and keeping friendships	20	50	20	9	2
Led astray by peer pressure*	23	35	28	12	2

# 5=always, 4= often, 3=sometimes, 2=occasionally, 1=never.

* For these 2 items, the scale is reversed: 5=never, 4=occasionally, 3=sometimes, 2=often, 1=always.

The range of correlations between the items rated by teachers was r=0.23 to r=0.53. Again, this is broad, and indicates that a child who has high social skills with their peers in one area may not have such a high level of skills in another. The highest correlation was between being able to work with other children without needing adult intervention, and making and keeping friendships. Interestingly, there is little correlation between the capacity to make and keep friendships, and being led astray by peer pressure: children who are poor at friendships are no more likely than those who are good at friendships to succumb to peer pressure. Nor do children who lose their temper appear to have a lower capacity for friendship.

The overall measure of Social Skills with Peers is composed of the 4 items rated by teachers, and the 2 stages of the 2 social problem solving tasks given to the children, with each of the six items or stages contributing equally. These tasks are described below.

The median score at age 8 was 69 percent. This is much the same as it was at age 5 and slightly higher than at age 6.

Scores for the social problem-solving tasks [17] showed very little correlation with teachers' ratings for the social skills used in working with other children in the classroom environment.

Social Problem-Solving Tasks

The first task focused on getting a fair share of a scarce and valued resource. The children were asked what they would say or do if someone in their class had been using the class set of felt-tips for a long time, and they wanted to use them. They were then asked what they would do if their first action made no difference. The second task focused on bullying. The children were asked what they would say or do if they were playing outside at lunchtime and another child picked on them, and again, what their next action would be if their first response made no difference.

Sharing a Scarce Resource

In their initial response, most children (80 percent) were polite, giving answers such as "*say please*", or "*I'd like a turn*". This is a similar percentage as at ages 5 and 6. Seven percent would ask an adult to help them, much the same as at age 6, but twice as many as at age 5. Eight percent would add a justification to their request, such as "*You've had a good turn with the pens, I think it's my turn now.*" Two percent would enter into some negotiation, offering a trade—much the same proportion as at age 6. One percent would look for another source of supply. One percent of the children offered an aggressive response, the same proportion as at ages 5 and 6.

Most children do not try the same response twice. Only 15 percent of the children would keep making a social request if their first overture did not work. This is somewhat lower than at ages 5 and 6. However, the proportions of children who would become passive (8 percent), or aggressive (5 percent) were much the same at both earlier ages. Eleven percent would look for another source of supply. On the second attempt, slightly more children would justify their request (11 percent), or turn to negotiation (5 percent). One percent would ask another child to help. But many children would turn to a teacher for help (43 percent).

All but one of the children who offered an aggressive response first would turn to a teacher if their aggression did not meet with success; most of the children who were aggressive in their second response had offered a social request to start with.

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[17] These tasks drew on the principle of the tasks we used at ages 5 and 6, devised by Spivack and Shure as described in Holloway and Reichart-Erickson (1988). These tasks focused on a desirable play object.

Response to Bullying

Children were quicker to turn to an adult if the problem with a peer involved bullying. Twenty-nine percent would ask a teacher to help them. Just over half the children (53 percent) offered an assertive response such as "*Could you please stop that because I didn't really like that*", or *"I'd say an I message, like "I don't like what you're doing and I'd like you to stop it."* Two percent sought help from a peer. Nine percent would go somewhere else, or find something else to do. Four percent of the children did not know what they would do, and 3 percent would meet bullying with aggression.

Second attempts to stop bullying became more teacher focused (47 percent). There was also an increase in evasion (going elsewhere or doing something else, 18 percent), and in passivity (6 percent). Twenty-three percent of the children would continue to respond assertively. Unlike the increase in aggression between the first and second responses to trying to get a turn of a scarce resource, there was no increase in aggressive responses to bullying between the first and second responses. However, more children continued to be aggressive in their second response.

Boys were more likely to offer an aggressive second response than girls: otherwise there was no difference between boys' and girls' responses. Māori children were least likely to offer an assertive first response, and most likely to go somewhere else or do something else for their second response to bullying.

Individual Responsibility

Most children scored highly for the item "follows class routines without having to be reminded". The median score at age 8 on our measure of Individual Responsibility was 70 percent, somewhat lower than the 83 percent at ages 5 and 6. This difference may reflect our addition of two new items to this measure at age 8 ("does the child act without thinking?", and "can __ get on with his or her schoolwork without distraction?"), but may also indicate that teachers have higher expectations of 8 year olds than they do of 6 year olds.

Table 7

Individual Responsibility at Age 8 (N=523)

Rating → **Item ↓**	5 %	4 %	3 %	2 %	1 %
Keeps track of time, puts books away in right place	27	34	20	16	3
Clearly conveys own needs and feelings	20	37	31	10	2
Acts without thinking of consequences*	21	35	29	14	2
Follows class routines without having to be reminded	33	37	21	8	1
Gets on with work without distraction	20	41	23	14	3

# 5=always, 4= often, 3=sometimes, 2=occasionally, 1=never.

* Scale reversed: 1=always, 5=never

Correlations between items were somewhat higher at age 8 (r=0.14–r=0.74) than at age 6 (r=0.24–0.56), or age 5 (r=0.16–0.24). As at age 6, the highest correlation was between "individual responsibility in keeping track of his or her things", and "follows class routines without having to be reminded". There was also a high correlation (r=0.71 and r=0.72) between these 2 items and the ability of children to get on with their schoolwork undistracted. But all of these 3 highly matched items had little correlation with children's expression of their own needs and feelings, or with the extent to which they acted without thinking of the consequences. Eight year old children who follow routines, get on with their work, and keep track of their things in the classroom are just as likely as those who are less well self-disciplined to act without thinking of the consequences.

Task-assessed Competencies

Mathematics, Literacy, Logical Problem-Solving, Fine Motor Skills

These 4 competencies were assessed by tasks carried out by the children during the research interview. The average age when this interview took place was 8 years 1 month, the same as the age for the teacher interview, with the same spread of ages, from one child aged 7 years 10 months to one child aged 8 years 11 months.

Mathematics

As described in chapter 1, we used a reduced set of 20 items from the standardised PAT for Mathematics. The mean raw score out of 20 items was 12.58. Year 3 students scored 12.37, only slightly lower than Year 4 students, who scored 12.80. The median score after converting the raw scores to percentages was 65 percent.

The study children scored higher on 17 of the 20 items than did standard 2 (Year 4) children in the 1992 standardisation of the PAT mathematics, with an average of 63 percent compared to 54 percent of items correct. This difference may reflect the slightly higher proportion of children from higher income homes in our sample, better performance by our sample, or shifts over time in children's performance.

Literacy

Four assessments were used, as described in Chapter 1.

On the PAT Reading Comprehension test, the study children's mean raw score was 16.17. The mean raw score gave an average reading age level of 8 to 8½ years.

Year 3 students' mean raw score was 14.45, which was somewhat lower than the year 4 score of 17.39. The year 4 mean raw score is much the same as the score of 17.14 for year 4 (standard 2) in the NZCER review of PAT done in 1990.

The mean score on the Burt Word Reading test was 52.The highest score out of 110 items was 101. The study children had a higher mean score on the Burt Word Reading test than the mean score of 46 achieved by children aged 8 to 8 years 6 months when the test was standardised for New Zealand in 1980 (Gilmore, Croft and Reid 1981).

The median on teachers' estimates of the study children's reading ages, 9–9½years, was higher than that given by the PAT Reading Comprehension test.

The median on the Expressive Writing Task (described in chapter 1) was 63 percent.[18]

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[18] The writing task scores were not analysed in terms of their individual components, such as spelling, punctuation, vocabulary choice, or description. This task was developed for the study, so no comparisons with the wider population are available. Since the same task is being used at age 10, comparison between ages 8 and 10 will be possible.

The next table shows the correlations between these four assessments of the children's literacy at age 8. As one might expect, the writing task shows less correlation than others. The correlations between PAT reading comprehension, the Burt word reading test, and the teacher assessment of reading age are strong.

Table 8

Correlations Between the Four Measures of Literacy at Age 8

	Burt	Reading age	Writing
PAT	0.72	0.65	0.48
Burt		0.73	0.58
Reading age			0.51

Logical Problem-Solving

The study children's median score was 48 percent, on the Standard Progressive Matrices (SPM). The median scores at age 5 and 6 using 12 items from the Coloured Progressive Matrices were 64 percent and 57 percent respectively.

At age 8 the highest score out of 60 items was 48. The mean raw score of 27.8 was close to the mean raw score of 28.4[19] for the 8–8.5 months group on which the SPM were normed for New Zealand children in 1984.

Fine Motor Skills

The study children's median score on the Bruininks-Oseretsky Visual-Motor Control subtest was high, 88 percent. Three-quarters of the children scored 79 percent or more, including 50 children who scored 100 percent on this test. Most children could cut out a circle, draw a straight line, and copy freehand a circle and triangle. They were less proficient at drawing lines through curved paths, and copying freehand a diamond or overlapping pencils. The mean raw score for this test was 20.1 (standard deviation 3), slightly higher than the mean raw score of 17.6 (standard deviation 3.3) for 8 year olds in the US standardization.

Relationships between Competency Scores at Age 8

Can you predict a child's likely score on one competency measure from their score on another at the same age? With one or two exceptions, the answer is no.

However, some competency measures are more highly correlated than others. As at age 6, Communication scores had the highest correlation with scores on the other competency measures. But at age 8, Perseverance was also very close to Communication. As at age 6, the Fine Motor Skills measure had the lowest correlations with any other competency measure (none higher than r=0.37), but its level of correlations was higher than at age 6, particularly for Mathematics and the Literacy measures. Individual Responsibility was also more highly correlated at age 8 with Perseverance (r=0.80), Mathematics, the Literacy measures, and Social Skills with Peers. The level of correlations was lower at age 8 for Curiosity in relation to the social skills, and Communication. (Our full set of correlations between the competency measures is given in Table 1, Appendix 1.)

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[19] The standard deviation for the study children was slightly smaller, 9.4, than the standard deviation of 10.3 in the national standardization.

Using the correlations alone, a set of competencies does emerge which could be used to give some indication of children's overall performance. This set contains Communication, Perseverance and Individual Responsibility.

Correlations can only give us linear relationships, between individual competencies looked at one by one. To get a fuller picture of the relationships between the competency measures with each other, we undertook two other analyses of the relationships between the competencies: a factor analysis, and a principal components analysis.[20] When we did these analyses at age 6, they both showed three major groupings, with Curiosity somewhat out on its own. These three groupings were:

- Communication, Perseverance, and Social Skills
- Mathematics and Literacy
- Fine Motor Skills and Logical Problem-Solving.

The cognitive competencies (Mathematics, Literacy and Logical Problem-Solving) were related to each other, but not to the other dispositions and skill areas.

When we did the same two analyses at age 8, each analysis gave a different result.[21] The Principal Components Analysis gave us only one grouping, which resembled the picture emerging from the correlational analysis.

- Communication, Perseverance, Individual Responsibility, Mathematics and Literacy.

The Factor analysis gave us two main groupings.

- Mathematics, Literacy, and Logical Problem-Solving
- Curiosity, Social Skills with Adults, and Communication.

Although the two analyses gave different combinations, both showed an increasing convergence of the cognitive competencies (Mathematics, Literacy, Logical Problem-Solving), with other disposition and skill areas.

Individual Changes in Scores between Age 5, Age 6, and Age 8

How did individual children's scores change between age 5, age 6, and age 8? Can you predict a child's score at age 8 from the score they received at age 5 and age 6? Table 9 shows the correlations between individual scores (for the original study children only) on the teacher rated competencies. The correlations for Curiosity and Social Skills with Peers remained much the same over time; other show increased correlation over time. Children's individual scores at age 6 were a better guide than their age 5 scores for their age 8 performance for Individual Responsibility, Perseverance, and Communication.

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[20] The principal components analysis looks at "principal components"—that is, linear combinations arising from the data—to see how much each component accounts for the overall variance (or spread) of the competencies, and then at how much each individual competency contributes to a principal component.

[21] See Figure 1 and Table 2 in Appendix 1.

Table 9

Correlations Between Competency Scores at 5 and 6, 5 and 8 and 6 and 8 years old

	Correlation between 5yrs & 6yrs Scores n=298	Correlation between 5yrs & 8yrs Scores n=281	Correlation between 6yrs & 8yrs Scores n=281
Curiosity	0.31	0.28	0.27
Perseverance	0.26	0.37	0.42
Individual Responsibility	0.13	0.28	0.41
Social Skills with Peers	0.25*	0.29**	0.30
Social Skills with Adults	0.22	0.33	0.35
Communication	0.33	0.40	0.45

* n=297, ** n=280

As the next table shows, there was more consistency for scores on the task-assessed competencies than for scores on the teacher-rated competencies. Correlations between task-assessed scores also tended to be higher than those rated by teachers, though correlations between 5 years and 8 years for the Perservance and Communication competencies were similar to the task-assessed scores.

There are a number of possible interpretations for this difference betwen task-assessed and teacher-assessed competencies. First, most children were rated by different individuals each year. This is not ideal, though it is hard to avoid in any longitudinal study of children's progress which uses others' perceptions, unless the same parent was used each time. Second, it is likely that teachers have different expectations at different ages, and that some would have more experience of individual children than others if they had worked with them over a longer period of time. Third, the teachers were not impersonal observers. Some teachers and children may have had more favourable interactions than others.

As with the teacher-rated competencies, age 6 scores on the task-assessed competencies appear to be a much better guide than age 5 scores to children's performance at age 8, with the exception of Mathematics.

Table 10

Correlations between Children's Task-assessed Competency Scores at Age 5, Age 6, and Age 8

	Correlations between 5yrs & 6yrs Scores n=292-297	Correlation between 5yrs & 8yrs Scores n=273-279	Correlation between 6yrs & 8yrs Scores n=279-281
Mathematics	0.69	0.57	0.60
Fine Motor Skills	0.33	0.35	0.28
PAT Reading Score (cf. Early Literacy at age 5, cf. Burt at age 6)	-	0.41	0.65
Burt Word Reading Test (cf. Early Literacy at age 5, cf. Burt at age 6)	0.45	0.39	0.78
Writing Score (cf. Early Literacy at age 5, cf. Burt at age 6)	-	0.36	0.50
Teacher Perception of Reading Age (cf. Early Literacy at age 5, cf. Burt at age 6)	-	0.37	0.68
Logical Problem Solving	0.37	0.34	0.48

r=0.43 for Invented Spelling at age 6 & Early Literacy at age 5. Invented Spelling was not used to compare with anything at age 8.

Correlations between scores show one aspect of children's individual performance over time. A fuller picture is provided by looking at children's achievement in relation to each other, as we do in the next section.

Movement Between Quartiles From Age 5 and Age 6 to Age 8

We analysed the movement of children's scores between quartiles after the first year at school. Would a child scoring in the bottom quartile (that is, the lowest 25 percent of children) at age 5 stay there at age 6 or age 8? We compared a random distribution of bottom quartile children with their actual numbers in each quartile to see if the actual numbers could have occurred by chance.

Not surprisingly, we found that most movement was between quartiles next to each other. Children who were in the top and bottom quartiles at age 5 were more likely than those who had been in the middle quartiles at age 5 to be in the same quartiles at age 8—as they had been at age 6. This was particularly marked for children in the lowest quartile, most strongly for Mathematics, Literacy, and Communication.

Children who were in the bottom quartile at age 5 were very unlikely to be in the top quartile at age 8 for Communication, Curiosity, Mathematics, and Literacy. This is the same pattern as we found at age 6, with two exceptions. Children in the bottom quartile at age 5 for Perseverance and Social Skills with Adults had a better chance at age 8 of being in the top quartile than they had at age 6.

Children who were in the top quartile at age 5 were likely to stay in that quartile at age 8 for all competencies bar Curiosity, Perseverance, and Social Skills with Adults.[22] These children were very unlikely to be in the bottom quartile at age 8 for any of the competencies bar Curiosity.

We found similar patterns when we looked at quartile movement between age 6 and age 8. However, it was even more unlikely for children who were in the lowest quartile at age 6 to move out of that quartile, particularly for Mathematics, Literacy, Logical Problem-Solving, Communication, Individual Responsibility, and Perseverance. These are the competencies that seem to be increasingly interlinked.

At the other extreme, it was also more likely that children who were in the top quartile at age 6 would remain there at age 8, particularly for Mathematics, Literacy, Communication, and Individual Responsibility.

We also began to see some signs of increased stability in the two middle quartile groups. Children in the second quartile at age 6 were likely to remain in that quartile at age 8 for Literacy, Mathematics, and Perseverance. Children in the third quartile were more likely to stay in that quartile for Literacy, Individual Responsibility, and Curiosity.

Gender, Income, Ethnicity, and Maternal Education

Within these general movements across quartiles, are there different patterns for different children? Do different children need different support at different stages of their schooling? We looked at this in a number of different ways. First we looked at "retention" rates of children staying in the same quartile over time. Next, we looked at the rate at which children who started in the lowest quartile increased their performance over time to the extent that they were in the top quartile at age 8, and vice versa: the children who started in the top quartile, but whose performance deteriorated over time to the extent that they were in the lowest quartile at age 8.

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[22] This is consistent with Young-Loveridge's finding for her study of the growth of children's number concepts that children in the bottom and top quartiles at age 5 for number knowledge were likely to be in those quartiles again at age 9, with more movement in the middle quartiles (Young-Loveridge,1991, p.24).

Gender

Boys' scores started to be lower than girls at age 6 for most competencies, and remained lower, with some widening of the gap, at age 8 (see Table 82, p. 134 for details). In looking at progress over time, boys show more volatility than girls, but also a somewhat greater tendency to remain in the lowest quartile over the first three years of school. Girls who start in the top quartile are more likely to remain there than boys who start at that level.

Lowest Quartile at age 5

Boys in the lowest quartile at age 5 were more likely than girls who were also in the lowest quartile at age 5 to stay there at age 6 for Literacy, Fine Motor Skills, and Curiosity. Girls in the lowest quartile at age 5 were more likely than boys to remain there at age 6 for Logical Problem-Solving.

Between age 5 and age 8, the boy/girl patterns were more similar in terms of retention, with the only differences being that boys were more likely to remain in the lowest quartile at age 8 for Communication and Logical Problem-Solving.

There were more differences in the movement of children from the bottom to the top quartile between age 5 and age 8. Girls were less likely than boys to make this move for Mathematics, Writing, or Reading Age; boys were less likely than girls to make this move for the PAT Reading Comprehension test, Individual Responsibility, Communication, and Social Skills with Adults.[23]

Differences between boys and girls were even more apparent between the ages of 6 and 8. Boys were more likely than girls to find themselves in the bottom quartile at both ages for everything but Mathematics, Reading Age, Social Skills with Peers, and Writing, for which girls were more likely to stay in the bottom quartile. Boys who were in the lowest quartile at age 6 were less likely than girls who were also in the lowest quartile at age 6 to make the top quartile at age 8 for Logical Problem-Solving, the PAT Reading Comprehension test, Reading Age, Perseverance, and Social Skills with Adults.

Top Quartile at age 5

Between age 5 and age 6, girls were more likely than boys to remain in the top quartile for Mathematics, Communication, and Logical Problem-Solving. Boys were more likely to remain in the top quartile for Curiosity and Perseverance.

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[23] Young-Loveridge (1991:25–38) found that girls in the lowest quartile for number knowledge at age 5 were more likely than boys to remain there at age 9. Boys who started below the median made more progress than girls in mathematics over the first 4 years of school. However, girls who started in the top quartile were more likely to be there at age 9. Girls showed more stability than boys.

Girls were less likely than boys to move down from the top quartile at age 5 to the bottom quartile at age 6 for Communication; boys were less likely than girls to make this downward move for Logical Problem-Solving and Fine Motor Skills.

More differences were apparent between ages 5 and 8. Girls were more likely than boys to remain in the top quartile at both ages for Communication, Writing, and Individual Responsibility. Boys were more likely than girls to remain in the top quartile at both ages for all the Literacy measures bar Writing, and Logical Problem-Solving.

But girls were less likely than boys to move from the top to the bottom quartile for Mathematics, Writing, and Reading Age. Boys were less likely than girls to make this downwards move for Communication, Individual Responsibility, Social Skills with Adults, the PAT Reading Comprehension test, and the Burt Word Recognition test.

Between age 6 and age 8, boys were twice as likely as girls to remain in the top quartile for Mathematics and Curiosity, but girls were twice as likely to remain in the top quartile for Communication. Girls also had a higher rate of top quartile retention for Writing.

Girls were less likely than boys to move downwards from the top quartile at age 6 to the bottom quartile at age 8 for Perseverance, Communication, Individual Responsibility, and Social Skills with Adults.

Middle Quartiles

There were signs of some differences in retention within the middle quartiles. Boys in the second quartile at age 6 were more likely than girls to remain there at age 8 for Mathematics, and for the PAT Reading Comprehension test and Burt Word Recognition test. Girls in the second quartile at age 6 were more likely to remain there at age 8 for Perseverance.

Girls in the third quartile at age 6 were twice as likely as boys to remain there at age 8 for the PAT Reading Comprehension test, and more likely to remain there for the Burt Word Recognition, Reading Age, Logical Problem-Solving, Curiosity, and Individual Responsibility.

Proportions of boys in the lowest and highest quartiles

We also looked at changes in the proportions of boys in the lowest and highest quartile groups over time. Boys were increasingly over-represented in the lowest quartile group over time, particularly for Perseverance, Individual Responsibility, Communication, and the social skills. They were under-represented for Logical Problem-Solving and Curiosity.

In the top quartile group, boys were under-represented at age 8 for Individual Responsibility, the social skills, and Communication. But for Mathematics, their over-representation had grown at age 8.

Ethnicity

At age 5 and age 6, ethnicity showed no associations with children's competency levels once family income was taken into account. At age 8, the associations were wider, and most remained after taking family income and maternal qualification into account. Māori[24] and

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[24] Many Māori children attend Te Kohanga Reo before coming to school. Few of our children had such experience, since Te Kohanga Reo were not part of the first phase of our study. It may be that the differences

Pacific Island children scored lower than others.

We focus here on any differences between Pakeha/European and Māori children over the first three years of school, since we do not have sufficient numbers of children in other ethnic groups. Our division here is at the median, rather than quartiles.

Māori children were more likely to stay below the median for some, but not all competencies, and though their retention above the median was higher than Pakeha/European retention between ages 5 and 6, Māori children who started above the median at age 5 or who were there at age 6 were more likely than Pakeha/European children who also started above the median, to slip below it by age 8.

Patterns between age 5 and age 6

Between age 5 and 6, Māori children who were below the median at age 5 were more likely than Pakeha/European children who were also below the median at age 5 to remain there at age 6 for Mathematics and Literacy. Pakeha/European children who were below the median at age 5 were more likely than Māori children to remain there at age 6 for Curiosity, Communication, and Fine Motor Skills.

Of the children who were above the median at age 5, Māori children were more likely to remain there at age 6 for Mathematics and Logical Problem-Solving, and Pakeha/European children for Perseverance, Communication, Literacy, and Fine Motor Skills.

Patterns between age 5 and age 8

Between age 5 and 8, Māori children who were below the median at age 5 were more likely than Pakeha/European children to remain there at age 8 for Mathematics and Literacy. Pakeha/European children who were below the median at age 5 were more likely than Māori children to remain there at age 8 for Logical Problem-Solving, Communication, and Social Skills with Adults.

Pakeha/European children who were above the median at age 5 were more likely than Maori who were above the median at age 5 to remain there, for all the competencies bar Curiosity, Social Skills with Peers, and Fine Motor Skills.

Patterns between age 6 and age 8

Māori children who were below the median at age 6 were more likely than Pakeha/European children to remain there at age 8 for Mathematics, Literacy (other than Reading Age), Perseverance, and Social Skills with Adults. Pakeha/European children who were below the median at age 6 were more likely than Māori children to remain there for Communication and Social Skills with Peers.

Māori children who were above the median for Curiosity at age 6 were more likely than Pakeha/European children to remain there at age 8. Pakeha/European children who were

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found in this study would be altered if children from Te Kohanga Reo were included. On the other hand, the National Education Monitoring Project's national assessments have found ethnic differences favouring Pakeha/European children, and their sample would include children who have attended Te Kohanga Reo, though not Kura Kaupapa Māori.

above the median at age 6 were more likely than Māori children to stay there for all other competencies bar Social Skills with Adults, Fine Motor Skills, and the PAT Reading Comprehension test, where there was no difference.

It would seem that while there was no difference between Māori and Pakeha/European children in their progress in some of the competencies, Māori children were more likely to remain below the median, or slip back over time in some of the key competencies, which were linked to overall progress. This raises some important questions which need further exploration.

Family Income

We found associations between family income and children's competency levels at ages 5 and 6, and again at age 8 (Tables 85 and 86, p. 139–140). To see if there were any differences in the patterns of children's progress over the first three years of school, we divided children into two groups: those with family incomes of $30,000 or less, and those with higher incomes. Higher income children were more likely than lower income children to remain in the top quartile, and less likely to move downwards to the lowest quartile over these three years.

Lowest quartile

Lower income children who were in the lowest quartile at age 5 were more likely than higher income children who were also there at age 5 to remain in the lowest quartile at age 6 for Mathematics, Literacy, and Logical Problem-Solving. They were less likely than higher income children to move to the top quartile for Curiosity.

Higher income children in the bottom quartile at age 5 were more likely than lower income children to remain there at age 6 for Curiosity, Communication, Fine Motor Skills, and Social Skills with Peers. They were less likely than lower income children to move to the top quartile for Perseverance, Social Skills with Peers, and Communication.

Between ages 6 and 8, lower income children in the bottom quartile were more likely than higher income children to remain there for Mathematics, the Literacy measures other than Reading Age, and Logical Problem-Solving. They were less likely to move to the top quartile for Writing or Mathematics.

Higher income children in the bottom quartile at age 6 were more likely than lower income children to remain there at age 8 for Curiosity, Perseverance, and Social Skills with Peers. They were less likely to move to the top quartile at age 8 for Communication.

In terms of movement between age 5 and age 8, we found that lower income children who had been in the bottom quartile at age 5 were more likely than higher income children to remain there at age 8 for Communication, Mathematics, the Literacy measures other than Writing, and Logical Problem-Solving. They were less likely than higher income children to move upwards to the top quartile at age 8 for Literacy, Logical Problem-Solving, and Fine Motor Skills.

Higher income children who had been in the bottom quartile at age 5 were more likely than lower income children to remain there at age 8 for Curiosity, Perseverance, Individual Responsibility, Social Skills with Adults, Writing, and Fine Motor Skills. They were less likely than lower income children to move to the top quartile for Curiosity, Communication, and Mathematics.

Top Quartile

Higher income children in the top quartile at age 5 were more likely to stay there at age 6 for all competencies bar Social Skills with Peers. They were less likely to move to the bottom quartile than lower income children who were in the top quartile at age 5.

Higher income children in the top quartile at age 6 were more likely than lower income children to remain there at age 8 for Literacy, Communication, Logical Problem-Solving, Individual Responsibility, and Fine Motor Skills. They were less likely to shift to the bottom quartile at age 8 for Mathematics, Communication, Logical Problem-Solving, and Fine Motor Skills.

Low income children who were in the top quartile at age 6 were less likely than higher income children to move to the bottom quartile at age 8 for Communication and Individual Responsibility.

Children from lower income families who had been in the top quartile at age 5 were more likely than those from higher income families to remain in the top quartile at age 8 for only one competency, Fine Motor Skills.

By contrast, higher income children were more likely to remain in the top quartile for Mathematics, Literacy, Logical Problem-Solving, Communication, and Individual Responsibility. They were also less likely to move to the bottom quartile for all the competencies than children from lower income families were.

Children from homes with different income levels do show different patterns of progress over the first three years of school. Lower income children were more likely than higher income children to remain in the lowest quartile for some of the key competency areas, particularly those that include knowledge, such as Mathematics and Literacy. Higher income children were more likely to remain in the lowest quartile for the dispositions which aid learning, and social skills. As with ethnicity (and there is some correlation between ethnicity and family income level), children from the lower income groups who started well appeared to find it harder to sustain that level of performance.

Maternal Qualification

Mother's education also plays a prime role in children's competency levels. To see if children whose mothers had different levels of qualifications had different performance patterns over the first three years of school, we divided the children into two groups: those whose mothers' qualifications ranged from none to a trades qualification, which we call "non-tertiary", and those with a tertiary or university qualification, which we call "tertiary".

Children whose mothers did not have a tertiary qualification

Children in the lowest quartile at age 5 whose mothers' education was non-tertiary were more likely than those whose mothers had a tertiary qualification to remain in that quartile at age 6 for Literacy, Communication, and Logical Problem-Solving. They were less likely to move up to the top quartile for Literacy.

Between age 6 and age 8, the same pattern was evident, but included more competencies, particularly Mathematics and Individual Responsibility.

Retention in the lowest quartile was even more evident when we looked at progress between age 5 and age 8 for children whose mothers' education was non-tertiary. Those who started in the lowest quartile were more likely than those whose mothers had a tertiary qualification to remain there at age 8 for every competency bar Individual Responsibility.

They were less likely to have moved to the top quartile at age 8 for Mathematics, the PAT Reading Comprehension test, Logical Problem-Solving, Communication, Individual Responsibility, or Social Skills with Adults.

However, children in the top quartile at age 5 whose mothers had a non-tertiary education were more likely than those whose mothers had a tertiary qualification to remain in the top quartile at age 8 for Communication and Writing.

Children whose mothers had a tertiary qualification

Children in the lowest quartile at age 5 whose mothers had a tertiary qualification were les likely to still be there at age 8 than their peers whose mothers did not have a tertiary education. They were more likely to remain in the bottom quartile at age 8 for Fine Motor Skills only.

Children in the top quartile at age 5 whose mothers had a tertiary qualification were more likely to remain there at age 8 for Literacy, other than Writing, Logical Problem-Solving, and Fine Motor Skills. They were less likely to move down to the bottom quartile for Logical Problem-Solving, Perseverance, Social Skills with Adults, Fine Motor Skills, the Burt Word Recognition test, and Reading Age.

We found that children whose mothers had a tertiary education were more able than those whose mothers had less education to score well at age 5, and remain high scorers, or, if they started with low scores, to make up the ground during their first three years of school.

Differences in patterns due to gender and family resources

These analyses showed that there are different patterns of initial school progress related to gender or differences in children's home resources. Children's school experiences are not uniform, even when they may be in the same classroom. Children from homes with well educated parents and a reasonable income are likely to be much more comfortable with and confident in the work and environment they encounter in school, since it is more likely to build on what they have already encountered at home. It is probably easier too, for well educated parents to support their children's school learning.

Predicting Competency Scores at Age 8 From Scores on Another Competency at Age 5 and Age 6

Can age 5 and age 6 performance on a particular competency measure predict age 8 performance on other competency measures? To find out, we used two different analyses: a skill-score measure[25] and analysis of children's quartile movements over time.

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[25] This was originally devised for use in assessing the match between forecast weather and actual weather. Skill-score refers to the skill of the forecasting system. It reduces (penalises) a prediction's contribution to a score by an amount proportional to the distance the result which eventuated was from the prediction. Heavy rain appearing when cloudy weather was forecast would attract a lower score than drizzle. The skill-score chosen was that devised by Neil R Gordon ("Evaluating the Skills of Categorical Forecasts", *Monthly Weather Review* Vol.110 No. 7, July 1982, pp. 657–661, American Meteorological Society). This measure quantifies the relationship in a contingency table with respect to the degree to which one dimension can be considered to be linked with the other.

In our skill-score analysis, we "penalised" most strongly differences of 3 quartiles between estimates of children's performance arising from their performance at the earlier age, and their actual performance at age 8. In other words, the larger the numbers of children moving from the lowest to the highest quartiles, and vice versa, between the ages of 5 and 6, the lower the degree of predictability.

At age 6, we found that the score on the Mathematics measure at age 5 was the best predictor for scores at age 6 across all competencies.[26] Age 5 Mathematics scores were also the best predictor of scores at age 8 across all the competencies. However, there was considerable variation in the level of association, ranging from a good prediction level of 0.55[27] for Reading Age to a poor prediction of 0.09 for Social Skills with Adults.

Our Literacy measure at age 5 consisted of two main sections, early reading behaviours and name writing. When we divided this measure into two sections, we found that name writing scores were in fact a better predictor than early reading behaviours for children's competencies at age 6 and age 8, and came second to Mathematics overall.

Table 11 shows how many predictive associations above 0.25 (see footnote 27 below) each competency had with other competencies. The pattern shown is similar to that found in our principal components analysis.

Table 11

Number of Predictive Associations ≥ 0.25 between any Given Competency Score at Age 5/Age 6, and Scores for All Competencies at Age 6/Age 8

Competency	**Predictive association**		
	From age 5 to age 6	**From age 5 to age 8**	**From age 6 to age 8**
Mathematics	7	7	7
Literacy	4	5	6
Early Writing	6	7	-
Emergent Reading	3	4	-
Logical Problem-Solving	7	4	3
Communication	7	5	8
Perseverance	4	4	7
Fine Motor Skills	3	3	1
Curiosity	3	1	4
Individual	1	4	7
Responsibility	2	2	5
Social Skills with Adults	2	5	8
Social Skills with Peers			

Among age 6 scores, the Literacy measure (Burt Word Reading score) was the strongest indicator of age 8 scores, particularly for Literacy, Mathematics, and Communication. Mathematics scores at age 6 were also good indicators for the cognitive competencies at age 8, as was Communication.

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[26] See Tables 5, 6, and 7 in Appendix 1 for full results.

[27] Predictability scores of around 0.5 or greater are considered to indicate good forecasting in meteorology, if the "penalty" function is appropriate. The number of factors which play a part in children's progress are much greater than those for weather, giving rise to greater variability between individuals. We have therefore reduced our threshhold for a reasonable level of prediction to ≥ 0.25.

Scores at age 6 for Communication, together with Individual Responsibility and Perseverance, were the strongest indicators of children's scores in the social competencies at age 8.

Another way of exploring the relative impact of competencies over time is provided by our analysis of quartile movement across the years. By looking at the rate of retention within quartiles and the rate of movement from the lowest to the highest quartile and vice versa, we can compare the average departure from the rates which would be expected if movement across the years was by chance. Between the ages of 5 and 6, Mathematics, Literacy, and Logical Problem-Solving were the best indicators of children's progess overall. Between the ages of 5 and 8, Mathematics and Literacy were the strongest indicators of children's overall progress, followed by Communication, Logical Problem-Solving, and Social Skills with Peers. Between the ages of 6 and 8, when there was more stability, Literacy, Mathematics and Communication were the strongest indicators of children's overall progress, followed by Perseverance.

These analyses show some definite patterns of association and clustering. Performance in some competencies *does* gives an indication of performance in others. The clustering also indicates that the skills, knowledge, and experience or habituation gained or used in one area of competency are of use in other areas of competency.

But these relations between competencies are not fully predictive. It would be unwise to try to use a limited set of measures at age 5 to predict children's performance across the board at ages 6 or 8.

Summary

Age 6 performance was a better guide than age 5 performance to children's performance at age 8. There was more consistency in performance over time on the "cognitive" competencies (Mathematics, Literacy, Logical Problem-Solving) than on social skills and curiosity. But there was also a growing convergence of the cognitive competencies Mathematics and Literacy, with Communication, Perseverance, and Individual Responsibility. These 5 competencies form a cluster which provides the best indication of children's overall performance at age 8 (in the areas of competency included in this study).

Children who started at age 5 in the bottom and top quartiles are the most consistent in their performance over time. There were signs of increased stability between ages 6 and 8 in the middle quartiles also.

There are quite marked differences in the patterns of children's progress over the first 3 years of school. These differences raise some important issues in relation to lowering the disparities in achievement between Māori and non-Māori, and between children from families with lower incomes or with low levels of maternal education, and children from families with higher incomes or high levels of maternal education.

The gender differences we found at age 6 widened at age 8. In looking at progress between age 5 and 8, we found that boys showed more volatility than girls. But boys who started in the lowest quartile at age 5 were more likely than girls to remain there at age 8, and less likely to make up ground between ages 5 and 6. In the top quartile, more boys remained for Mathematics and Curiosity, but more girls for Communication and Writing.

At age 8, for the first time, differences according to ethnicity remained after taking family income and maternal education into account. We found that compared with Pakeha/European children, Māori children who started below the median at age 5 were more likely to remain there at age 8, and to make less progress between ages 5 and 6. Māori children who started above the median at age 5 were more likely than Pakeha/European children who started above the median at age 5 to remain there for Mathematics and Logical Problem-Solving at age 6, but not at age 8.

Similar patterns were found in relation to family income and maternal education. Children from families with low incomes or low maternal education showed a greater tendency to stay in the lowest quartile, and to move out of the highest quartile, than other children.Children from these families who scored well at age 6 tended to find it harder to score well (relative to other children) at age 8. It seems that children from low income families may find it harder than children from high income families who also started with a lower level of knowledge and skills than others to make progress at school. It also seems as if children from low income families who are doing well at age 6 may fall back relative to their peers from more advantaged homes by age 8. Our analysis in section II provides some possible reasons why this may be so, particularly in terms of the fewer home resources and out-of-school experiences available to children from low income families.

CHAPTER 3

FAMILY RESOURCES, CHILDREN'S HEALTH, AND CHILDREN'S BEHAVIOUR

In this chapter we describe the family resources available to the children, and any changes in those resources, or in other important aspects of the children's lives, between age 6 and age 8. We discuss family income, parents' employment, relations with absent parents and extended families, and childcare. Parents' assessments of children's health are outlined, as well as parents' views of the behaviour they found unacceptable in their child, their responses to such behaviour, and their responses to difficulties their children might be having.

Family Composition

Ninety-six percent of the children were living in the same house as their birth mother, and 80 percent in the same house as their birth father. Seven percent of the children had a step-parent. Four percent also lived with their grandmother, 2 percent with their grandfather, 4 percent with another relative, and 2 percent with a non-relative. Seven percent also lived with one member of their extended family, and 3 percent lived with 2 or 3 members of their extended family.

Fifteen percent (n = 80) of the children came from sole-parent families. In 9 percent (n = 7) of these the child's father was the sole parent. Women with no educational qualifications were more likely to be sole parents (28 percent) than were women with mid-school-trades qualifications (16 percent), or women with tertiary-university qualifications (8 percent). Just under half the sole-parent families had been sole parents when the child was aged 5.

Eight percent of the children were the only children in their family. Forty-four percent had one sibling, 35 percent two siblings, 16 percent three siblings, and 5 percent between 4 and 7 siblings.

Most children lived in households with 4 or 5 people (33 and 31 percent). Twelve percent lived in 3-person households, 15 percent in 6-person households, and 6 percent in households with 7 or more people. Only 2 percent of the children lived in two-person households. The average number of people in the household increased from 4.02 for the lowest income families to 4.6 for low income families and 4.8 for families with middle or high incomes. Reflecting the high proportion of sole parents in the lowest income group, 42 percent of the children from families in the lowest income group were in households of 3, compared with 18 percent of those from the low income group, and 6 percent of those from the middle and high income groups. Pacific Island families were the most likely to be living in households with 6 or more members.

Seventy-five percent of the children were Pakeha/European (n = 393), 9 percent Māori (n = 49), 7 percent Pacific Island (n = 35), 4 percent (n = 22) Asian, and 4 percent (n = 19) were from European migrant families.

Family Income

The data at age 8 continue to show a wide disparity in the income resources available to children in different family types. Of the two-parent families in the enlarged study sample, 43 percent had annual incomes of over $60,000, and 45 percent had between $30,000 and $60,000. Only 12 percent had less than $30,000. By contrast, 7 percent of sole-parent families had over $60,000, 14 percent had between $30,000 and $60,000, and 25 percent had between $20,000 and $30,000. Over half of the sole-parent families in our study, 54 percent, had less than $20,000 a year to live on.

More Māori families (25 percent) were in the lowest income group, with $20,000 or less per year, than were families from other ethnic groups. Pacific Island families were least likely to be in the highest income bracket (3 percent), compared with Māori families (16 percent), and Pakeha/European (42 percent).

The next table compares the family incomes of the study children at age 5, age 6, and age 8 (the enlarged sample), and sets these alongside the 1996 Census data on household incomes for one family households with children.[28] Our study sample is reasonably representative of one family households with children living on $40,000 or less a year. However, the sample over-represents those earning over $40,000, reflecting the higher average income of the Wellington region.

Table 12

Family Income

Income Bracket		(Age 5) 1993–94 (n = 307) %	(Age 6) 1994–95 (n = 297) %	(Age 8) 1996–97 (n = 523) %	1996 census income data for one family households with school children
Over $80,001		12	16	22	19
$70,001–$80,000 per year	"high income"	7	6	6	
$60,001–$70,000 per year		9	10	8	16
$50,001–$60,000 per year		11	13	14	
$40,001–$50,000 per year	"middle income"	14	12	14	10
$30,001–$40,000 per year		17	15	11	12
$25,001–$30,000 per year	"low income"	5	8	6	7
$20,001–$25,000 per year		4	3	4	4
$15,001–$20,000 per year		6	6	6	5
$15,000 and or less per year	"lowest income"	11	7	12	9
Refused		1	1	1	-
Do not know/cannot remember		1	2	2	19*

* not specified

Between the ages of 5 and 8, 65 percent of family incomes stayed in the same bracket, 8 percent moved down one income bracket, 14 percent moved up from very low to low, or from low to middle, and 11 percent moved up from the middle to the high income bracket. The income increases parallel increases in the proportion of mothers in paid employment in the study, from 59 percent at age 5 to 72 percent at age 8, with the greatest increase in full-time employment.

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[28] 1996 Census: National Summary, p 91, Table 36.

Source of Income

Wages or salary were the main source of income for 64 percent of the study families.[29] For 13 percent, the main income source was self-employment, and for 7 percent, income came from both wages and self-employment. State benefits were the main source of income for 16 percent. Twenty percent of these, all recipients of the Domestic Purposes Benefit (DPB), supplemented their benefit with income from wages.

The main income source for the top two income groups was wages or salary, whereas for the bottom income group, it was state benefits. Patterns of self-employment also differed for the different income groups: 28 percent of the top income group were self-employed (combined with wages or salary for 10 percent), compared with 18 percent of the second income group (combined with wages/salary for 6 percent), and 14 percent of the third income group (combined with wages or salary for 2 percent). Family Support also supplemented earnings for families in the low and lowest income brackets. Only 7 percent of the group on less than $20,000 a year had self-employment as their main income source.

Most (75 percent) of the lowest income families received state benefits. While 60 percent of sole parents received the Domestic Purposes Benefit (DPB) in some form, wages or salary were a main income source for 46 percent of the sole-parent families. Eight percent were self-employed, and 11 percent also received Family Support. Self-employment was higher among two-parent families (22 percent), and receipt of Family Support lower (5 percent), reflecting the higher incomes of most two-parent families. Māori and Pacific Island families were less likely to be self-employed. Māori families were the most likely to be receiving the DPB.

Over a third, 35 percent, of the children's families were either receiving a government income benefit, or had received one since the birth of the study child. Fourteen percent were currently receiving a benefit, and 21 percent had previously received one. Half of the benefits previously received were unemployment, 36 percent were the DPB, 7 percent Accident Compensation, and 6 percent sickness benefit.

Half the families where the husband was in unskilled work had received a benefit at some stage. This is twice the rate for those in skilled work, and three times the rate for those in professional work. This reflects the decreasing proportion of jobs for unskilled workers.

Two-parent families were more likely to have received unemployment benefit. Twenty-eight percent of those who had once received a state benefit, but were not currently receiving one, had incomes of less than $30,000, compared with only 6 percent of those who had never received a state benefit. Fifty-one percent of those who had never received a state benefit had high incomes, compared with 17 percent of those who had.

Fourteen percent of the families had been without any money coming in at some stage since the birth of the study child. Of those who had been without money, 39 percent had had no income for a month or less, 34 percent for 2–3 months, 22 percent for 4–6 months, and 5 percent for between 6 months and 2 years. The proportions of families which had been without any money coming in at all at some stage were the same for both sole-parent and two-parent families. The two groups most likely to have been without money were those in the low income bracket, and those with fathers in unskilled work. There were no differences related to ethnicity.

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[29] This compares with 1996 Census figures for income sources for the age group 25–50 of 48 percent wages or salary, 16 percent self-employed, and 14 percent receiving government benefits.

Proportion of Income Spent on Housing

We asked parents to tell us approximately how much of their family income after tax was spent on housing, to give some idea of what resources might be available for other expenses, including children's activities.

Eight percent of the parents said they spent more than half their family income on housing, and 15 percent spent around half their income; 25 percent spent around a third of their income; and 44 percent spent a quarter or less of their income. Eight percent could not say what proportion of their family income was spent on housing.

Sixty percent of the highest income group spent a quarter or less of their income on housing, compared with 43 percent of the middle income group, 29 percent of the low income group, and 24 percent of the lowest income group. By contrast, half of the lowest income group and 42 percent of the low income group found housing costs taking half or more of their income, compared with 21 percent of the mid income group, and only 13 percent of the highest income group. Families whose main source of income was a state benefit or who received the Family Support supplement for low-paid workers were twice as likely as others to be paying half or more of their after-tax income on housing (43 and 49 percent respectively).

This indicates that the differences between income groups are compounded when the focus shifts from total income to the proportion of income available, after tax and housing costs, for spending on everything else, including education and activities for children.

Parental Employment

Twenty-nine percent of the mothers were in full-time employment (up from 19 percent when the child was 5), 43 percent were employed part-time, and 28 percent were not in paid employment.

Sixty-three percent of mothers not in paid employment would like paid work, and another 7 percent would like temporary work. Availability of work, at decent pay rates, availability and affordability of childcare or after school care and training, lack of flexibility in working hours, their need to care for younger children, and their own health were the barriers they faced.

Female sole parents and those from two-parent families had much the same rates of employment, both full- and part-time. Sole parents who were not in employment were more likely to want to find paid work (85 percent, compared with 58 percent of women in two-parent families). Sole parents were more likely to identify lack of work with decent pay and the need for retraining as their main obstacles to finding paid work.

Women with no qualification or a mid-school qualification were more likely not to be in employment (40 percent, compared with 22 percent for women with higher qualifications).

In contrast with age 6, when we found that mothers who were not currently employed were equally likely to have been in unskilled, skilled or professional jobs at the birth of the family's first child, at age 8 we found that women who had been in unskilled work previously were now more likely not to be in paid work. However, women who had had professional jobs previously were less likely to be in full-time work than others, and more likely to be working part-time (54 percent, compared with 40 percent of women who had had skilled jobs, and 23 percent of women who had had unskilled work). Three-quarters (75 percent) of employed women with university degrees had professional jobs, and 3 percent had unskilled work; women with no qualifications were most likely to have unskilled work (50 percent) if they were employed. Women with trade qualifications were just as likely as those with mid or senior school qualifications to be doing unskilled work.

Hours of Employment

The average week on the job was 40.87 hours for full-time employed mothers, and 15.23 hours for part-time employed mothers. Part-time employment fell into three major groups: less than 10 hours a week (38 percent of those mothers employed part-time), 11–20 hours a week (38 percent), and 21–29 hours a week (24 percent). Over a third, 36 percent, of the mothers in full-time jobs put in 30 to 40 hours a week, and 53 percent worked 40 to 50 hours a week. Women in unskilled jobs were most likely to be working less than 10 hours a week, and professional women most likely to be working 40–50 hours a week.

The average working week for fathers employed full-time was 48.85 hours. Thirty percent of the men employed full-time put in an average of 51 or more hours a week. Seven percent of the fathers were unemployed.

Of the women who were employed, 10 percent held more than one job, and 45 percent said that their job involved irregular hours, weekend work, shift work, long hours, or travel. Irregular hours were more likely for women employed full-time than for those employed part-time. This is a change from the similarity in working patterns for men and women found when the children were aged 6.

The men were less likely (3 percent) to hold two jobs, reflecting the high proportion in full-time jobs. Sixty-one percent of the men worked irregular hours, worked at weekends, had long hours, did shift work, or travelled in their paid employment. What was once outside the norm for paid work—hence the term "irregular"—is now becoming much more the norm, for women as well as men.

Care of Children

Looking at parental support systems, we found that parents themselves did most of the caring for the study children before and after school, during school holidays, or when the children were sick (96 percent). Twenty-eight percent could also call on grandparents or other relatives, 9 percent on the child's former early childhood education centre or caregiver, and 8 percent on friends. At age 8, 13 percent used a school-related programme (such as after school care), whereas at age 6, 5 percent had done so. Seven percent noted that they could care for their child themselves when not working those hours. Most used several forms of care for their child.

The next table shows how these options are related to the pattern of the main caregiver's paid employment when the child was 8. Full-time employed parents continued to rely primarily on themselves and on their own relatives, but they were also the most likely to make use of a former ECE caregiver or a school-related programme.

Table 13

Main Caregiver Employment and Childcare at Age 8

Main caregiver's employment status → Form of Care for Child ↓	Full-time in paid work (n=163) %	Part-time in paid work (n=217) %	Not in paid work (n=141) %
Parent	83	93	90
Relatives	45	26	11
Friends	12	10	2
Former ECE caregiver	22	4	2
School related programme/OSCAR	23	10	5
Parent not employed before/after school or in school holidays	6	8	8

Note: columns do not add up to 100% because most parents use more than one form of care, particularly those in paid work.

Enduring relations with the child's preschool caregiver or early childhood service provided some children and families with continued support. Fourteen percent of families on the highest incomes used a former caregiver, compared with 5 percent of families with middle incomes. Sole parents made more use of school-related programmes (24 percent, compared with 11 percent of parents in two-parent families). Parents with university qualifications were the most likely to use a school related programme (28 percent, compared with 11 percent of parents educated to tertiary level, 11 percent with trade qualifications, 7 percent with senior school, 9 percent with mid-school and 3 percent with no qualifications).

Contact with Extended Family

Most of the children had some contact with their extended families. Only 11 did not. Despite being in regular contact, the extended family played only a small part in the lives of 15 percent of the children. By contrast, 4 percent of the children had only irregular contact with their extended family, yet it played a large part in their lives. Seven percent had only irregular contact, of not much weight in their lives.

Patterns of contact with extended family when the study children were 8 showed little overall change from the patterns found when the children were 5 and 6. However, the proportion of children in regular contact with their extended family rose from 51 percent at age 5 and 45 percent at age 6 to 61 percent at age 8. In the case of families interviewed when the child was aged 6, just over half the children separated by distance from contact with other family members were now back in touch with their extended family. Distance was now a factor limiting contact for 10 percent of these children at age 8, compared with 19 percent at age 6.

Asian families were more likely to say that the extended family played a large part in their children's lives (73 percent, compared with 59 percent for non-Asian families). More girls than boys were in families where the extended family was in regular contact but played only a small part in their lives (20 percent, compared with 10 percent).

Sixty-four percent of the children in sole-parent families and 63 percent of the children in blended families continued to see their non-resident parent regularly. Another 14 per cent of the children in sole-parent and 10 percent of those in blended families rarely saw their non-resident parent, usually because they lived somewhere else. Fifteen percent of the children in sole-parent and 22 percent in blended families did not see their non-resident parent. Seven children had a deceased parent. Although some children (11 percent) had an up and down relationship with their non-resident parent, not one was said to have a poor relationship. Most of those who saw their non-resident parent (83 percent) got on well with them.

The 5 things that children did most with non-resident parents[30]—physical and social-based activities, exploration, watching television and routine housework—were also those they did with their parents at home. Fewer non- resident parents were reported to engage in routine housework with the child (19 percent, compared with 42 percent of those at home). It was uncommon for non-resident parents to eat out with their child (3 percent), whereas it was a relatively popular pastime for study families overall (22 percent).

Change in the Children's Lives

Most of the study children, 67 percent, had moved house at least once since they were born. Thirty percent of the study children had moved house once, 12 percent twice and 8 percent three times. Thirteen percent had moved more than three times. Those whose main caregiver had no qualifications were the least likely to be living in the same house — only 6 percent said that they had not shifted house at all, compared with 25 percent of main caregivers with mid-school qualifications, 22 percent with trade qualifications, 13 percent with tertiary qualifications and 18 percent with university qualifications. Sole parents were more likely to have shifted many times: 15 percent had shifted five times or more, compared with 7 percent of two-parent families. Families who were currently receiving a state benefit or who had previously received a benefit were twice as likely as those who had not to have shifted three or more times.

To some extent, this reflects changes in the family: 67 percent of those currently receiving a state benefit had experienced changes in the parental partnership since the study child's birth, as had 34 percent of those who had formerly received a state benefit, but only 16 percent of those who had not received a state benefit. This indicates the important role of state benefits in buffering families against major changes in human and financial resources. But the findings also suggest a connection between benefit income and difficulty in finding stable housing.

Twenty-seven percent of study parents reported changes in their family relationships since their child was born. Nineteen percent of the study parents had experienced a partnership break- up and 7 percent said they now had a new partner. Nine percent reported changes in child custody and access arrangements. Six percent said that there had been other changes in the household composition such as the birth of another child. Some had experienced the death of their partner (7 parents) or another family member living in the household (8 parents).

Parents in the lower income brackets were the most likely to have undergone a relationship change. It is not clear from our data whether a relationship change resulted in a family losing income and entering a lower income bracket, or whether there is more likelihood of relationships changing for people in low income brackets. Over half, 56 percent, of parents in the lowest income bracket and 39 percent in the low income bracket said that they had broken up with their partners, compared with 14 percent of parents in the middle income bracket and 9 percent in the highest. Eight percent of the parents in two-parent families said that they had a new partner.

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[30] As reported by the resident parent.

We also asked about more recent changes in the children's lives, occurring in the past 2 years. Moving house and changes in household composition such as the birth of a sibling continue to be the big sources of change, followed by changes in parental jobs or in hours worked.

Table 14

Changes in Children's Lives

Change	Change over 3-4 years, at age 5 (N=307) %	Change over 1 year between 5-6 (N=297) %	Change over 2 years between 6-8 (N=521) %
Moved house	50	19	21
Household composition changed	47	26	21
Parent changed job/work hours	22	16	10
One parent often absent/absent long-term	16	6	4
Change of early childhood education centre (age 5) or school (age 6 & 8)	14	4	7
Death of family member/friend	13	6	8
Change of school	7	n/a	n/a
Accident/major surgery for family member	6	5	5
Financial difficulty	5	1	1
Parents separated	n/a	4	7
Parental stress	n/a	3	4
Custody/access arrangements	n/a	3	5
Child's friends	n/a	n/a	4
Child's class	n/a	n/a	4
Parent has new partner	n/a	n/a	2
Increased demands of a household member	n/a	2	1

N/A= not asked

Sole parents were more likely than parents in two-parent families to say that there had been changes in the past two years (78 percent compared with 59 percent). We found only one other indicative difference: parents on low incomes were more likely to say that there had been changes than parents on the lowest incomes. Again, it is not clear whether the changes preceded a drop in income.

Things Unsettling Children

Forty-four percent of the parents identified something which was unsettling for their child when they were near 5 years old. At older ages a significantly lower proportion, 36 percent at age 6 and 32 percent at age 8, were reported to have something unsettling them. The things that unsettled children at age 8 covered broadly the same range as at age 6. A third of these children were experiencing friction at home. Other things unsettling them were: bullying, changes in the parent's job, ill health, school itself, a change in the family, relations with a non-custodial parent, moving house, and changing classes, with the consequent loss of friends

Fifty percent of children from sole-parent families were reported to be unsettled, compared with 29 percent of children from two-parent families. More children from families in the lowest income group and the middle income group were reported to be unsettled than were those from families in the highest income group (40 percent and 36 percent, compared with 25 percent). Fifty-three percent of children whose mothers had a senior school qualification were reported to be unsettled, compared with 32 percent of children whose mothers had a trade qualification, 29 percent a tertiary qualification and 25 percent a mid-school qualification.

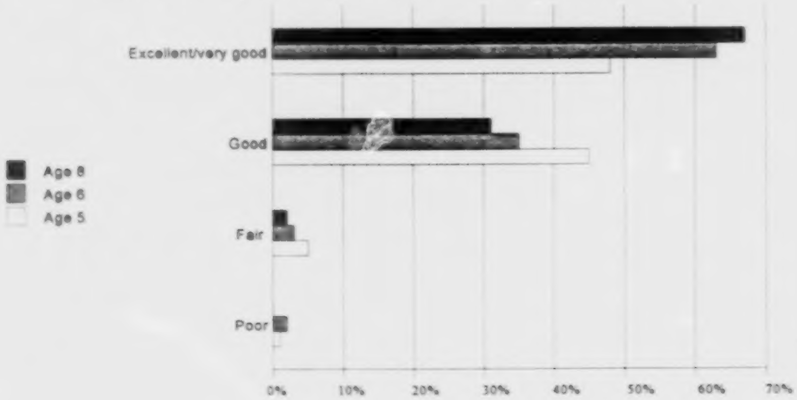
As the study children grew older they appeared to become more capable of handling stress. Forty-two percent of the children who were unsettled were said to be coping well, compared with 27 percent at age 6 and 20 percent at age 5.

Children's Health

The children's health status continued to show some overall improvement from ages 5 and 6 to age 8, as the next figure shows.

Figure 2

Parents' Perceptions of Their Child's General Health



The main health problems mentioned by those who described their children's health as being other than excellent were chronic illness such as asthma, and ear infections. The drop in the number of parents reporting children's susceptibility to catching colds at age 8 compared with age 6 is significant; this reduced susceptibility is likely to have been reflected in parents' general perceptions of the children's overall health. Although the number of children reported to be bearing the effects of long term illness, injury or accident was small (17), the change at age 8 is significant, as no children were reported to be in this category at age 6. Table 15 compares the children's main health problems, as reported by parents, at ages 5, 6, and 8.

Table 15

Parents' Reports of Children's Health Problems

Ailment	At age 5 (n = 148) %	At age 6 (n = 106) %	At age 8 (n = 172) %
Chronic illness	35	36	45
Ear	31	23	22
Frequent colds	25	21	10
On medication	12	7	10
Effects of illness/injury/accident	1	-	10
Chronic allergies	20	10	8
Growth problems	n/a*	-	8
Listless/tired	4	10	5
Eyes	-	2	5
Catches everything going	7	6	3
Takes a long time to recover/recuperate	4	3	3
Seeing specialist	n/a*	-	3

n = number of parents who said their child had a health problem. Children could have more than one health problem reported.

* *We asked these as separate questions at age 5. Eighty-one parents representing 54 percent of those identifying problems said their child was visiting a specialist. Just over half of these reported growth problems (cognitive, physical, emotional) and 8 percent reported congenital problems requiring specialist intervention. This information was volunteered by parents at age 6 and 8.*

At age 6 children's health status was poorer in the lowest income families We found a more variable pattern at age 8. Fifty-six percent of parents in the lowest income group and 62 percent in the middle income group described their child's health as excellent or very good compared with 77 percent of parents in the highest income group. Children whose parents were receiving a state benefit, or who had received a state benefit, were also less likely to be reported in excellent or very good health (59 percent) than those whose parents had not (70 percent). Children whose parents received a state benefit were more likely to have a chronic illness and to be on medication.

Parental Views of Children's Unacceptable Behaviour

What kind of behaviour displayed by their children did the study parents find unacceptable? Table 16 compares parental responses to this question when their children were 6 and 8 years old.

Table 16

Parents' Views of Unacceptable Behaviour from Their Children

Behaviour	Age 6 (N = 297) %	Age 8 (N = 521) %
Rudeness to parents/ignoring parents	44	44
Physical fighting	36	33
Tantrums	29	27
Swearing	21	24
Rudeness to people other than parents	21	21
Loudness	13	21
Teasing/irritating other children	–	21
Disobedience	29	19
Lying	14	16
Whining	16	8
Not tidying room	11	6
Selfishness/not sharing/uncaring/unkind	–	6
Bullying	13	5
Stealing	6	5
Being bossy	–	5
Sulking	–	4
Not eating properly	6	3
Cruelty to animals	–	2

Only 4 percent of the parents gave no response to this question. Of those who did, 24 percent mentioned only one type of unacceptable behaviour, 29 percent 2, 25 percent 3, 16 percent 4 or 5 kinds of unacceptable behaviour, and 6 percent more than 5 kinds.

We cannot tell from this question whether parents' responses were guided by their experiences with their own children, and/or their own values. The behaviours which were mentioned most at ages 6 and 8 are those which are related to rudeness to parents (or other adults), or disruptive behaviours, such as fighting or tantrums. However, although fewer parents mentioned bullying itself, parents of children at age 8 did mention behaviours associated with bullying, such as teasing, and unkindness or other harmful behaviours such as cruelty to animals. In a recent survey of South Canterbury primary school children aged 9 years and over, it was found that "bullying at school is frequently mentioned by the children, often picked up by the parents, but usually unnoticed by the teachers".[31] A recent study of 11 and 12 year old children (Forms 1 and 2) shows bullying to be a common and hurtful experience; it shows emotional abuse such as name calling, catty gossip or tale telling to be even more common than physical abuse, with name calling also occurring in the community and tale telling at home.[32]

Not surprisingly, given the greater number of boys whose favourite activity was physical, boys' parents were more likely than girls' parents to mention physical fighting (59 percent compared with 41 percent) and swearing (44 percent compared with 30 percent). More boys' parents (50 percent) than girls' parents (38 percent) also singled out being rude to parents as an unacceptable behaviour.

Asian parents were less likely to mention physical fighting (9 percent, compared with Māori parents, 35 percent, and Pakeha/European parents, 34 percent), and were also less likely than Māori parents to mention tantrums as unacceptable (5 percent compared with 41 percent). Tantrums were more unacceptable to parents on middle incomes than to parents on the highest incomes (36 percent compared with 19 percent). More Pacific Island parents than Asian parents found swearing unacceptable (26 percent compared with 5 percent).

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[31] Maxwell et al (1996) p.34

[32] Maxwell and Carroll-Lind (1997) p. 5

Parents with university qualifications were more likely than parents with no school qualifications to find teasing an unacceptable behaviour (31 percent compared with 14 percent). Rudeness to their parents was an unacceptable child behaviour for 51 percent of parents with tertiary qualifications, compared with 30 percent of parents with a senior school qualification.

Parental Responses to Misbehaviour

The parents of study children at age 6 had different responses to different kinds of misbehaviour. The next table compares the parents' responses to this question when their children were aged 6 and at age 8. This pattern repeats itself at age 8. It is still uncommon to find an 8 year old child who does not lie, fight, or leave their room untidy! Parents did not differentiate between boys and girls in their response to unacceptable behaviours.

Table 17

Parents' Responses to Children's Misbehaviour

Parental Response	Lying		Untidy room		Fighting	
	When study child aged 6 (N=297) %	When study child aged 8 (N=521) %	When study child aged 6 (N=297) %	When study child aged 8 (N=521) %	When study child aged 6 (N=297) %	When study child aged 8 (N=521) %
Talk through/negotiate	49	51	11	8	39	40
Cut treat/nice activity	10	14	22	24	4	7
Tell child off	16	19	13	12	16	19
Send child to room/time-out	10	7	6	6	30	38
Separate children	-	-	-	-	19	-
Help the child	-	-	23	12	-	-
Cut back pocket money	1	1	5	7	-	-
Ask for an apology	3	1	-	-	8	8
Give child a task or chore to do	1	1	-	1	2	1
Physical punishment	11	5	3	1	7	4
Ignore	4	2	14	15	3	7
Child does not lie; or leave room untidy; or fight (as per column heading)	18	25	9	21	16	18

Sole parents were more likely to say that their child never left their room untidy (30 percent, compared with 19 percent of children in two-parent families). There were three income related differences, all associated with middle income families. Parents in the middle income bracket were more likely to tell their child off for not tidying their room than parents in the highest income bracket (17 percent compared with 4 percent). They were also more likely than parents in the low income bracket either to make the child tidy their room (17 percent compared with 4 percent) or to tidy it together with the child (27 percent compared with 17 percent).

Parents in different ethnic groups had some different patterns of reaction to the various child misdemeanours. Pakeha/European parents were more likely to say that their child never lied than Māori parents were (28 percent compared with 12 percent). Forty-two percent of

Pakeha/European parents would discipline their child for fighting with another child by sending the child to their room, or making the child take time out, compared with 14 percent of Asian parents. Fifty-four percent of Pacific Island parents would take disciplinary action if their child fought with another child by discussing such a misdemeanour with the child, compared with 14 percent of Asian parents.

Parents with a university qualification were more likely to tidy their child's room together with the child than were parents with no qualifications (19 percent compared with 6 percent). If a child lied, parents with no or only school qualifications were more likely to cut out treats for the child than were parents with post school qualifications (25 percent compared with 12 percent). They were also more likely to say that they used physical punishment (8 percent compared with 2 percent of parents with post school qualifications).

Parents with no qualifications were also more likely to tell the child off for lying than were parents with tertiary or senior school qualifications (31 percent compared with 10 percent and 10 percent). Parents with trade qualifications were also more likely to tell the child off than those with tertiary qualifications (25 percent compared with 10 percent).

No parents with university or tertiary qualifications were represented in the 4 percent of parents who mentioned the use of physical punishment if their child fought with another child. Parents with university or tertiary qualifications were more likely to discuss such misbehaviour with their child than were parents with no qualifications (46 and 43 percent compared with 25 percent). Twenty-seven percent of parents with no qualifications said that their child did not fight with other children, compared with 12 percent of parents with mid-school qualifications and 2 percent of parents with senior school qualifications.

Parental Response to Children Having Difficulties in their Activities

We asked the parents what they would do if they saw that their child was having real difficulty with something. Most would do as they did when the children were 6: offer some form of assistance or advice. About half (49 percent) would try to facilitate the child's efforts by asking the child if they wanted help and acting accordingly, 28 percent would offer encouragement to the child to persevere, 20 percent would show the child how to do it, and about the same proportion (19 percent) would wait for the child to initiate a request for assistance. Four percent said it depended how much time they had, or patience, 3 percent would tell the child to find something else to do and 2 percent would do it for the child. A handful (5) said that they would be critical of the child. Parents did not vary their approach according to the gender of the child.

Parents with trade qualifications were least likely to offer encouragement to their child to complete a task (16 percent compared with 37 percent of parents with senior school qualifications, 35 percent with university qualifications, 33 percent with tertiary qualifications and 31 percent with mid-school qualifications). Twenty-four percent of parents with mid-school qualifications said that they would show their child how to do a task, if they were having difficulty completing it, compared with 11 percent with university qualifications.

Home Resources

The Third International Mathematics and Science study found that the higher the number of books in the homes of New Zealand children aged 8 and 9, the higher children's mathematics and science achievement.[33] Around 60 percent of households in this study were well stocked with books, owning 400 or more (4 percent reported owning between 1000 and 4000 books.) About 40 percent of households had less than 400 books: 6 percent had between 200 and 350 books, and 22 percent 100 to 200 books. Twelve percent of households did not have many books, ranging from as few as 5 to around 90.[34]

The Third International Mathematics and Science study also found a significant relationship between achievement and the total number of a set of items found in children's homes.[35] We used some of these items. All the families had a washing machine. Stereo sets and video recorders were also common (94 and 93 percent respectively). Sixty-seven percent of the children had their own desk to work at. Only 5 families did not have a telephone; 12 did not have television, and 19 were without a car.

The next table shows the associations of family income levels, ethnicity, family type, and maternal qualification type with household item ownership.

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[33] Martin in (1997) p.144. The TIMSS study used ownership of books and possession of certain household items as a surrogate for socioeconomic status.

[34] ibid p.143. Fifty-seven percent of standard 2 and 3 students estimated that they had more than 100 books in their homes and 17 percent of students estimated that their homes had 25 books or less. In comparison 88 percent of parents in this study estimated that they had over 100 books and only 7 percent estimated that they had 25 books or less.

[35] ibid p.145

Table 18

Association of Family Characteristics with Ownership of Household Items

Household item → **Family Characteristic ↓**	**Child's own desk (N=521) %**	**Child's own bedroom (N=521) %**	**Computer (N=521) %**	**Second Car (N=521) %**
Overall	*67*	*58*	*71*	*56*
Income				
More than $60,000	72	67	90	74
$30–60,000	65	53	68	57
$20–30,000	63	47	45	33
Less than $20,000	57	40	45	18
Ethnicity				
Pakeha/European	68	63	76	59
Māori	47	45	45	47
Pacific Island	60	31	46	40
Family Type				
Two-parent	67	57	76	65
Sole-parent	64	64	46	9
Mother's Qualification				
No qualification	45	58	39	39
Mid-school	74	50	67	57
Senior school	63	47	77	43
Trade	68	65	68	58
Tertiary	69	62	77	69
University	70	59	90	61

Receipt of Daily Newspaper

About three-quarters of the main caregiving parents said that they read a daily newspaper at least once a week; 53 percent read one daily and 4 percent most days. Others read a daily newspaper less often. Eight percent read one 3 or 4 times a week and 8 percent once or twice a week. Twenty-six percent did not read a daily newspaper.

Table 19

Association of Family Characteristics With Receipt of Daily Newspaper

Family Characteristic	When child aged 6 (N=297) %	When child aged 8 (N=521) %
Overall	*58*	*53*
Income		
More than $60,000	74	65
$30-60,000	64	54
$20-30,000	39	37
Less than $20,000	20	26
Ethnicity		
Pakeha/European	62	55
Māori	46	43
Pacific Island	33	51
Family Type		
Two-parent	65	56
Sole-parent	21	36
Mothers' School Qualification		
No qualification	45	38
Mid-school	49	46
Senior school	72	67
Trade	50	52
Tertiary	74	60
University	71	62

Most parents liked to read magazines or weekly newspapers (89 percent). Only 11 percent of parents had no preferences. Reading preferences included women's magazines – the most popular choice (53 percent), house and garden magazines (22 percent), liberal magazines such as the *Listener* (19 percent), middlebrow newspapers and magazines such as the *Sunday Star Times* (17 percent), work-related or business (12 percent), hobby magazines (10 percent), tabloid papers (4 percent), religious papers (3 percent) parenting, (2 percent), cultural (2 percent) and sports papers (1 percent). Twenty-eight percent of the parents also mentioned free papers, such as community newspapers.

There were no significant associations between gender and parents' reading habits, but there were some differences in the kinds of magazines or papers read by different income groups. The highest income parents were more likely to say they read work-related journals or papers, liberal papers and house and garden magazines, and less likely to report reading free community papers.

Mothers' qualifications were related to some magazine and newspaper reading preferences. Forty-five percent of mothers with university qualifications said that they read liberal magazines, compared with 19 percent of parents with other tertiary qualifications, 15 percent with trade, 20 percent with senior school, 6 percent with mid-school and 5 percent with no qualifications. Twenty-three percent of parents with university qualifications read work-related journals compared with 8 percent with trade qualifications, 7 percent with mid-school qualifications and 5 percent with no qualifications.

Summary

Two main patterns of family resources emerged here. First, the families with middle or high incomes are likely to be stable two-parent families, and, increasingly, to have two incomes. Mothers in these families are likely to have post-school qualifications. Children from these families have good health; they are less unsettled, and when they are, they are likely to cope. They have access to computers, are likely to have their own desk, and their families get a daily newspaper, a window on the wider world. By contrast, children in the low or lowest income brackets have experienced more changes in their families, and more shifts in homes. Though many have good health, this group is more likely to experience chronic health problems and need regular medication. Sole-parent families are much more likely to be in this income group simply because they have only one adult available for employment and also for childcare. The education levels of this group are generally lower, making it harder to find reasonably paid work. Unskilled workers — the low paid — also find themselves in this group. State benefits play a pivotal role in supporting the low paid, those who did not experience educational success, and families which can supply only one adult worker, usually a woman.

When the children were 5, 59 percent of the mothers were in paid employment. By the time the children were 8, 72 percent of the mothers were in paid employment, and most of those who were not would like to find jobs. The largest increase over the intervening three years was in full-time employment.

Twenty-seven percent of the children's parents had lost or changed partners in the 8 years since their birth. Twenty percent of the children did not live with their biological father, and 4 percent did not live with their biological mother. But most had regular contact with their non-resident parent, unless they were living in another town, and most were said by the resident parent to get on well with the non-resident parent. Overall, children's contact with their extended families had increased since age 5 and age 6.

CHAPTER 4

CHILDREN'S LITERACY AND MATHEMATICS ACTIVITIES AT HOME

Children have experiences at home that complement and support their learning at school. In this chapter we describe the children's engagement in reading, writing, and mathematics activities at home.

Home Reading Activities

At age 8 children had moved away from most of the pre-reading activities occupying them at age 5 and to some extent at age 6. However, more than half the parents still read to their children regularly. Twenty-nine percent read to their child at least once a day, 14 percent 3 to 4 times a week and 15 percent once or twice a week. Twenty-eight percent said they rarely read to the child.

Forty-four percent of children were reported to be doing their own reading, either in addition to or as a substitute for being read to by their parents. Parents also reported that more girls (53 percent) than boys (36 percent) did their own reading at home. There were no associations between whether children read or did not read at home, and the frequency with which their parents read to them.

More parents on middle incomes mentioned that their child did her/his own reading than did parents on low incomes (50 percent compared with 31 percent). Sixty-two percent of parents with a tertiary qualification said that their child did her/his own reading, compared with 29 percent of parents with university qualifications, 33 percent with senior school qualifications and 27 percent with mid-school qualifications.

Māori parents (43 percent) were more likely to read only rarely to their children than Pakeha/European parents (27 percent). Parents with university level qualifications were more likely to read to their children at least once a day (43 percent) than parents with mid-school qualifications (26 percent) or parents with no qualifications (19 percent).

We asked parents specific questions about 12 home reading activities. They reported that their children read a wide range of the printed material we asked about. As Table 20 shows, while most children were reported by their parents to be readers of fiction, more than half were reported to be also reading for information purposes, to learn more about things and to find out how to do things.

Table 20

Parents' Reports of Children's Home Reading Activities at Age 8

Reading Activity	N=521 %
Reads fiction	92
Reads books brought home from school for homework	88
Uses written instructions	83
Reads nonfiction	79
Uses a dictionary	55
Uses an encyclopaedia	55
Reads children's magazines	51
Reads adult magazines/newspaper	45
Reads comics/jokes	31
Reads teenage books	14
Reads teenage magazines	10
Reads adult books	9

Most children were reported by their parents as enjoying reading (76 percent) or gaining qualified enjoyment (15 percent). Nine percent were said to dislike reading.

Parents were much more likely to report that girls enjoyed reading (88 percent compared with 65 percent of boys). Girls were more likely to read fiction (96 percent compared with 87 percent of boys), to use a dictionary (63 percent compared with 47 percent), and somewhat more likely to follow instructions (87 percent compared with 79 percent of the boys). Boys were much more likely to read comics than girls (41 percent compared with 20 percent).

Children who liked reading were more likely to use a dictionary and to use written instructions than those who did not. Sixty percent of the children who liked reading used a dictionary, compared with 30 percent of those who did not like it; 87 percent who liked reading followed instructions, compared with 64 percent of those who did not like it. Fifty-seven percent of children who liked reading were readers of children's magazines, compared with 32 percent of the others, and 17 percent of those who liked reading read teenage books, compared with 4 percent of the others.

There were also differences in what children read related to family income and ethnicity. Children from families in the highest income bracket were more likely to use an encyclopaedia[36] than children from families in the middle or lowest income brackets (67 percent compared with 49 percent and 35 percent). They were also somewhat more likely to follow instructions (88 percent of children from the highest income families compared with 75 percent of children from families in the low and 69 percent in the lowest income bracket). Forty-seven percent of children from families in the low income bracket read comics and joke books, compared with 29 percent of children from families with middle incomes and 28 percent of children from the highest income group.

Pakeha/European children (57 percent) were more likely to use a dictionary than Pacific Island children (31 percent). There was one strong association with mothers' education: encyclopaedias were used by 64 percent of the children with mothers who had qualifications to university level, and 73 percent of children with mothers educated to senior school level, compared with 39 percent of those whose mothers had no qualifications. Children whose mothers had a university qualification were somewhat more likely (86 percent) to read nonfiction than children whose mothers had no or mid-school qualifications (74 percent).or children whose mothers had no qualifications(72 percent); they were also were more likely to follow instructions (87 percent, compared with 72 percent of children whose mothers had no qualifications).

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[36] We did not ask parents about their ownership of encylopaedias or any other kind of book, so we cannot report children's use in terms of their access at home.

Parents reported that 91 percent of the children belonged to a library. When children were specifically asked whether they went to a library, 83 percent said they did, whereas 40 percent had earlier mentioned reading library books at home. In all, 88 percent of the parents and their children agreed with each other on whether the children belonged to and visited the library. Twenty-two percent of the children said that they made weekly visits to the library to get books. Thirteen percent went once a fortnight, 7 percent went every three weeks and 13 percent went at least once a month. Twenty-eight percent either went occasionally or were unable to say exactly how often they visited the library.

Ninety-six percent of the children said that they read books at home. Three percent of those children reported by their parents as enjoying reading said that they did not read at home. Most of those who said that they did not read at home simply didn't like reading or preferred doing something else (3 percent). One said reading was too hard and another said that there were no books at home.

We put an open-ended question to the children about what kind of books they liked to read. The children's answers have been categorised and appear in table 21.

Table 21

Children's Reports of Books Read at Age 8

Books	N=523 %
Fiction	85
Nonfiction	23
School books—homework	19
Comics/joke books	5
Instruction books/manuals/recipes/puzzles	4
Reading to younger children/dolls and teddies	3
Using encyclopaedias/dictionaries	2
Other	1

Girls were more likely to mention fiction and reading to younger children. Boys were more likely to mention nonfiction and comics or joke books.

Children said to enjoy reading, or to gain some qualified enjoyment, were more likely to say that they read fiction than those said not to enjoy reading (86 percent and 90 percent respectively, compared with 64 percent). However, those children reported as not liking reading or gaining limited enjoyment from reading were more likely to say that they read school books (30 percent and 25 percent respectively) than those said to enjoy reading (16 percent).

Forty-three percent of the children who liked reading said that they read books from the public library, compared with 20 percent of those children who did not like reading, and 75 percent of those who liked reading said that they read books bought for them by an adult, compared with 54 percent of children who did not like to read.

Pacific Island children were much more likely than Pakeha/European children to report that they read school books (42 percent compared with 18 percent). Fifty-three percent of Pacific Island children said that they got books from their teacher or the school library, compared with 27 percent of the Pakeha/European children. Children whose mother had no qualifications were also more likely to say that they read books from school (33 percent) than children whose mothers had mid-school qualifications (17 percent), or children whose mothers had tertiary qualifications (18 percent).They were also less likely to say they read books from the library (24 percent) than the children whose mothers had either tertiary or university qualifications (49 percent). This corresponds with the parental reports. Ninety-six percent of parents with university qualifications and 92 percent with tertiary qualifications reported that their child belonged to a library, compared with 81 percent of parents with no qualifications.

Children from families with the highest income were more likely to say that they went to the library than children from families in the low income bracket. Children from families currently receiving a state benefit were less likely than others to belong to a public library (79 percent, compared with 92 percent of others).

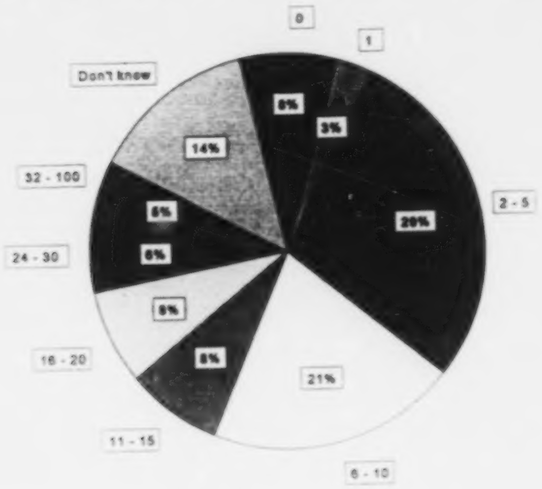
Parents' and children's reports of reading adult (including teenage) magazines are roughly the same, but there is a big discrepancy in parents' and children's reporting of reading children's magazines. Only 12 percent of children said that they read children's magazines, but 51 percent of parents said their children read children's magazines. This difference may be one of classification. For example, parents may see the children's section of a newspaper or magazine as a children's magazine. Children whose mothers had a senior school qualification were more likely (43 percent) to report that they read the newspaper than children whose mothers had mid-school qualifications (21 percent) or no qualifications.

As well as the 12 kinds of children's reading we asked parents about, they also mentioned that their children played word games (76 percent), read signs or brand names (11 percent), and read the Bible or religious tracts (5 percent).

We asked parents to tell us how many books their child had finished by themselves in the previous month, as a further rough indicator of children's reading experience. Figure 3 shows the distribution over a range between zero and 100. We found no significant differences on grounds of gender, parental income, ethnicity, mothers' education or the parental view of the child's enjoyment of reading. Given differences in reading achievement related to these variables (see chapters 9 to 11), this may suggest that using number of books read as an indicator of reading experience is too crude: there is, after all, a qualitative difference if the book read is *Finnegan's Wake*, or a Golden Book classic with pictures.

Figure 3

Parents' Estimate of Books Finished by Children in a Month



Parental Reading

We asked the main caregiving parents some questions about their own reading preferences. Most mothers who were main caregivers liked to read (87 percent), as did 74 percent of fathers who were main caregivers. Twenty percent of the fathers who were main caregivers would do so if they had time, compared with 10 percent of mothers. Only 12 main caregiving parents (10 mothers and 2 fathers) said that they did not like reading. Tastes included romantic fiction, cookbooks and gardening (mothers only) and nonfiction, a clear-cut preference for fathers.

Table 22

Main Caregivers' Reading Preferences

Preferences	Mother (n=482) %	Father (n=39) %
Fiction	59	43
Nonfiction other than cookbooks/guides/gardening books	49	74
Magazines	28	21
Mysteries/science fiction	18	15
Romantic	14	0
Cookbooks/guides/gardening books	12	0
Everything/anything	10	5
Poetry	2	0

Home Writing Activities

Sixty-four percent of the children were reported by their parents as enjoying writing generally and 17 percent were said to enjoy some writing activities. Nineteen percent of the children did not enjoy writing at all.

At age 6 most children were engaged in writing names, lists and copying printed material.

It was becoming quite common for them to write their own stories and poems. As the next table shows, children at age 8 were making increasing use of writing as a means of communicating with others as well as developing a strong interest in word games. Some children were also taking an interest in calligraphy (18) and a small number (5) wrote in a language other than English. Six parents said that their child could write musical notation.

Table 23

Children's Home Writing Activities at Age 6 and Age 8

Writing Activity	Age 6 (N=297) %	Age 8 (N=521) %
Copies printed material	80	82
Writes letters and cards to family/friends	n/a	82
Does word puzzles/crosswords	n/a	76
Writes stories or poems	66	n/a
Writes short imaginative stories under 2 pages	n/a	60
Writes long imaginative stories over 2 pages	n/a	20
Writes on the computer*	40	44
Writes reports (factual writing)	n/a	40
Writes a journal/diary	3	34
Writes poems	n/a	33
Copies family members' writing	59	33
Writes lists	90	21
Copies school work (e.g. stories)	n/a	20
Writes plays	59	14
Writes own name	n/a	n/a
Asks about specific letters	99	n/a
Takes part in TV/video/computer programme involving writing	96	n/a

* Not asked in relation to writing, but in relation to computer use. Table 36 shows that 44 percent of parents reported their children doing some form of wordprocessing.

There were strong gender associations for children's reported enjoyment with writing activities. Girls were much more likely to enjoy writing than boys (81 percent compared with 48 percent). More girls than boys did 7 of the 12 activities we asked about: writing letters and cards (93 percent compared with 73 percent), doing word puzzles (81 percent compared with 72 percent), writing short imaginative stories (74 percent compared with 47 percent), keeping a journal or diary (55 percent compared with 16 percent), writing poems (43 percent compared with 25 percent) writing long imaginative stories (25 percent compared with 16 percent), and writing plays (19 percent compared with 10 percent).

Although children from families in the middle income bracket were more likely to enjoy writing (70 percent, compared with 59 percent from the highest income families and 55 percent from families in the lowest income bracket), there were no income related differences regarding children's writing activities.

There was no clear pattern associated with children's actual writing activities and their mothers' educational qualifications. Children whose mothers had no qualifications were reportedly more likely to be writing short imaginative stories than children whose mothers had university qualifications (70 percent compared with 47 percent). They were also more likely to be writing plays (27 percent) than children whose mothers had mid-school, senior school or tertiary qualifications (around 10 percent for each). Report writing was more likely to be done by children whose mothers had a senior school qualification than by children whose mothers had mid-school or no qualifications (60 percent compared with 30 and 31 percent). Cards and letters were more likely to be written by children whose mothers had a university qualification than children with mothers educated to mid-school level (87 percent compared with 74 percent). Word puzzles were more popular with children whose mothers had a tertiary qualification than with children whose mothers had university qualifications (83 percent compared with 68 percent).

Home Mathematics

The next table compares children's home mathematics activities at age 6 and age 8. The table omits some number activities done at age 6 for which we have no comparative data, such as counting, telling their age, using numbers when doing or making things, and simple addition and subtraction.

Table 24

Children's Home Mathematics Activities at Age 6 and Age 8

Mathematics activity	**When child aged 6 (N=297) %**	**When child aged 8 (N=521) %**
Can use the telephone*	20	99
Plays board games	89	97
Plays card games*	11	95
Adds money correctly	29	82
Can use a calculator for simple addition/subtraction	n/a	80
Can use halves and quarters	n/a	77
Can programme video/microwave/radio etc.	n/a	77
Can tell the time	n/a	75
Can use a ruler to measure length or height	n/a	75
Plays computer games/uses computer for number activities	52	72
Can use a calculator for simple multiplication/division	n/a	43
Can do times tables up to 10	n/a	30
Tells or tries to tell the time	87	n/a
Knows money denominations	10	n/a
Uses a calculator*	11	n/a
Talks about halves, quarters and so on	65	n/a
Measures things	75	n/a
Says times-tables	21	n/a

* Information volunteered by parents at age 6; specifically collected at age 8.

There were few differences here related to family or gender. Slightly more boys than girls were said to add money correctly (86 percent compared with 78 percent). Consistent with our findings on computer ownership, children's playing of computer games was associated with differences related to income, family characteristics, ethnicity, and mothers' education, but not with gender.[37]

Asian and Pakeha/European children were more likely to use halves and quarters than Māori children (86 and 79 percent compared with 57 percent). Eighty-four percent of children whose mothers had a post-school qualification were using halves and quarters, compared with 67 percent of children whose mothers had a mid-school qualification and 63 percent with no qualifications. Eighty percent of children whose mothers had mid-school qualifications were using a ruler to measure things, compared with 64 percent of children whose mothers had no qualification. Only 55 percent of children whose mothers had no school qualifications were reported to tell the time, compared with 79 percent of children whose mothers had either school or post-school qualifications.

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[37] See Chapter 5.

Forty-four percent of the children also did other mathematical activities at home. Children were engaged in construction, drawing plans, making creative patterns for knitting, working with puzzle books and code breaking, getting to grips with multiplying and dividing large numbers and measuring things, as well as calculating trading profits and losses, keeping scores and analysing sports team performance statistics.

We grouped these activities into simple and advanced categories representing the 5 strands of the curriculum: geometry, algebra, number, measurement and statistics.[38] As Table 25 shows, just over a quarter of the parents reported children using simple geometry through such activities as playing with lego and doing jigsaw puzzles. Working with patterns, colouring in patterns and doing things such as cooking and sewing are reflected in the proportions shown for algebra (simple), and measurement (simple). A smaller proportion were reported to be using simple mathematics for such things as code breaking or dot to dot number puzzles (number), keeping sports scores (statistics), or advanced mathematics such as using knitting or tapestry patterns (algebra), making building plans (geometry), or multiplying and dividing large numbers (number). Only a handful were using advanced mathematics such as profit and loss calculations (measurement) and analysing sports scores (statistics).

Table 25

Other Home Mathematics Activities at Age 8

Activity	(n=230) %
Simple geometry	27
Simple algebra	16
Simple measurement	16
Simple number	7
Simple statistics	7
Advanced algebra	8
Advanced geometry	5
Advanced number	5
Advanced statistics	2
Advanced measurement	1

We found 4 differences related to children's participation in other mathematical activities.

Girls were more likely to be reported as doing activities which involved advanced algebra. Otherwise, there were no gender differences.

Children with parents in the higher income brackets were more likely to be engaging in activities involving simple measurement than children from families in the lower income brackets (9 percent compared with 2 percent). Fifteen percent of children whose mothers had university qualifications were engaging in activities involving simple measurement, compared with 5 percent whose mothers had tertiary qualifications and 2 percent mid-school qualifications. Twenty-five percent of children whose mothers had a university education were engaging in activities involving simple number, compared with 11 percent of children whose mothers had mid-school qualifications and 9 percent whose mothers had no qualifications.

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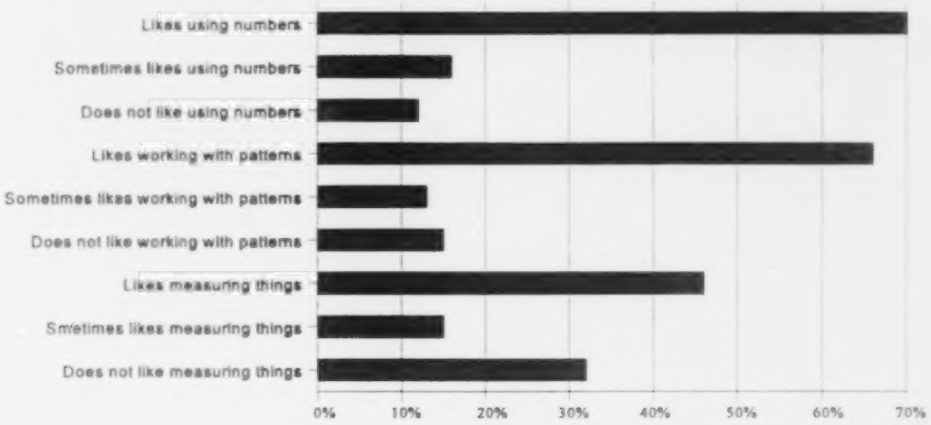
[38] Our thanks to Alex Neill, one of the mathematics specialists for NZCER's Assessment Resource Banks for primary schools, for this categorisation.

Figure 4 gives parents' responses when asked whether their children liked working with numbers, patterns, or measuring things. Parental opinions may be related to whether parents actually observed children's participation in an activity. More children liked working with numbers and patterns than measurement. Only 13 percent of the children did not like any of these uses of mathematics. Twenty-five percent liked only one of the three kinds of activities, 33 percent two kinds, and 30 percent, all three.

Figure 4

Children's Enjoyment of Numbers, Patterns, and Measurement at Age 8, as reported by parents



Girls were twice as likely as boys to be seen by their parents not to enjoy working with numbers, slightly more likely not to enjoy measuring, but twice as likely to enjoy working with patterns.

There were no associations between children's enjoyment of working with numbers, measuring things or working with patterns and children's playing of board, card and computer games or their ability to use the telephone or programme electronic equipment such as the family video.

Some indicative differences showed up when looking at children's ability to tell the time. Children who liked using numbers were somewhat more likely to be able to tell the time than children who did not (79 percent compared with 66 percent). Similarly, children who liked measuring things were more likely to be able to tell the time than those who did not like measuring things (79 percent compared with 70 percent). Children who liked using numbers were most likely to add money correctly than those who sometimes liked using numbers or those who did not like using numbers (81 percent, 75 percent, 59 percent); to use a ruler (81 percent, 65 percent, 59 percent); to use a calculator to do simple addition or subtraction (86 percent, 72 percent, 58 percent ; and to use a calculator to do simple multiplication or division (49 percent, 31 percent, 34 percent). Children who liked using numbers were also more likely than those who did not to use halves and quarters (81 percent compared with 63 percent) and to do times tables (35 percent compared with 16 percent).

Children who liked measuring things were most likely to use a calculator to work out simple addition and subtraction (90 percent) than those who sometimes liked to measure things (72 percent)and 73 percent who did not). Those who liked or sometimes liked measuring things were more likely to use halves and quarters (85 and 84 percent) than those who did not like to measure (66 percent). Children who liked measuring things were also more likely than those who did not to add money correctly (88 percent compared with 76 percent) and, not surprisingly, to use a ruler (91 percent compared with 58 percent).

Children who liked working with patterns were more likely to be able to do times tables (35 percent) than those who sometimes liked working with patterns (30 percent) or those who did not like working with patterns (15 percent). They were also more likely to use a ruler (81 percent, compared with 61 percent and 68 percent).They were more likely to add money correctly than the children who sometimes liked working with patterns (86 percent compared with 74 percent). They were more likely to use a calculator to do simple addition and subtraction than the children who did not like working with patterns (81 percent compared with 66 percent), to do simple multiplication and addition (46 percent compared with 30 percent) and to use halves and quarters (85 percent compared with 68 percent).

Summary

By the age of 8, most children's use of literacy and mathematics did not stop at the classroom door, but had become part of their lives at home. The public library was also a resource and experience for most children. Gender and family resource differences were apparent in relation to reading and writing, but not to mathematics. Maternal education was more of a factor than family income in children's literacy and mathematics activities. Children were thought by their parents to enjoy reading most, followed by writing and mathematics. Measuring was less usual, and least enjoyed.

CHAPTER 5

CHILDREN'S AND PARENTS' LEISURE ACTIVITIES

In this chapter we look at other activities which may have a bearing on children's competency development. We describe children's favourite home activities, use of the family computer and the children's television watching —and some differences in how parents and children report these activities. We also describe parents' reading, television watching, leisure-time activities, and study.

Family Activities Involving the Child

Table 26 compares parental reports of family activities involving their child at age 8 with those at age 5 and age 6.

Table 26

Family Activities With Study Children

Activity	**When study child aged 5 (N = 307) %**	**When study child aged 6 (N = 297) %**	**When study child aged 8 (N=521) %**
Physical	90	90	88
Exploration/special events	58	64	59
Socialising with others	66	55	56
Routine housework	60	47	42
TV/movies	28	26	37
Eating out	15	27	22
Literacy-related	38	24	17
Church/community	19	15	16
Mathematics/science-related	24	21	11
Animals	18	13	9
Aesthetic-creative	14	9	9
Sociodramatic	9	4	6
Music/dance	9	8	6
Related to parents' employment	7	7	3
ECS-related (at 5); School-related (at 6 & 8)	5	10	3

Family participation in some activities remained relatively constant over time: physical activities such as sport, walking or swimming, exploration, museum visits, concerts and the like, and going to church or taking part in community events. Between age 6 and 8 little or no change occurred in the pattern of family participation in social activities and the arts. However, the trend towards less family participation in literacy and maths-science related activities continued. Declining family involvement in literacy and maths-science related activities may reflect children's increasing mastery of skills and concepts. There were other changes in the overall pattern of family activities involving the study children: more going to movies and watching television, fewer activities related to the parent's employment, and less involvement in school activities, perhaps due to increased parental participation in the workforce.[39]

Family resources and ethnic origin made a few differences to what families did. Two-parent families were somewhat less likely to watch television or go to the movies than families with a sole parent (48 percent compared with 35 percent). Seventeen percent of parents in two-parent households said that they took part as a family in church and community activities, compared with 6 percent of sole parent families. Families in the highest income bracket were more likely to take part in physical activities than those in the lowest income bracket, (94 percent compared with 77 percent). They were also more likely to eat out and to participate in social activities than those on middle and low incomes. Thirty percent of those on the highest incomes dined out compared with 18 percent on middle and 14 percent on low incomes, and 65 percent participated in social activities compared with 54 percent of those on middle incomes and 41 percent of those in the low income bracket.

Pakeha/European families were much more likely than Pacific Island families to participate in physical activities (90 percent compared with 71 percent). Pacific Island families were much more likely to go to church together than Pakeha/European families and Māori families (51 percent compared with 12 and 10 percent respectively).

Parents with university and tertiary qualifications were more likely than parents with mid-school or no qualifications to mention watching television or going to movies as something the family did together (46 and 43 percent compared with 26 and 25 per cent respectively). More parents with university or tertiary qualifications also mentioned family participation in literacy related activities than did parents with mid-school and no qualifications (24 and 23 percent compared with 11 and 6 percent respectively). University educated parents were more likely to engage in exploration, participate in special events, or go on trips or holidays (77 percent compared with 59 percent of parents with trade qualifications, 51 percent with tertiary qualifications, 56 percent with no qualifications, and 49 percent with mid-school qualifications).

Thirty-nine percent of parents with no qualifications mentioned family participation in social activities with friends and extended family, compared with 65 percent of university educated parents, 63 percent of parents with senior school qualifications, 58 percent with tertiary qualifications and 56 percent with trade qualifications. Housework was more likely to be a family affair for parents with university qualifications than for parents with mid-school qualifications (51 percent compared with 35 percent).

Self-employed parents were least likely to mention routine housework or gardening, and with those whose main source of income was state benefits, to mention church or community activities. Families whose main source of income was state benefits were also less likely to participate in social activities (45 percent compared to 58 percent for others), and half as likely as the self-employed or those receiving wages to mention eating out.

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[39] These changes are unlikely to be due to the addition of children from the survey, since they were comparable in income, ethnicity and maternal qualification characteristics with the original sample.

Children's Favourite Home Activities

Both parents and children agreed that the three things children were most likely to be doing after school are watching television, engaging in physical play such as riding their bikes, or playing with other children. However, there were some significant differences between parents' and children's accounting for time spent on out-of-school activities. Parents were much more likely to report their children using the computer or engaging in cognitive or creative activities such as reading, art, and handicrafts, than were the children themselves. A higher proportion of children than parents singled out spending time doing things about the house or in the company of adults as something they did most often when not at school—e.g. eating, sleeping, shopping, housework and homework. Children generally saw themselves participating in social activities more frequently than did their parents.

The next table compares the children's responses with those of their parents.

Table 27

Activities Children Spend Most Time On at Home—Child and Parent Responses Compared

Activity	Children (N=523) %	Parents (N=521) %
Television	42	40
Physical	39	37
Playing with siblings/friends	39	32
Reading	19	36
Playing with toys/dolls/guns etc.	16	18
Art/drawing/photography	15	27
Using the computer	15	22
Eating/sleeping/dressing/grooming	11	1
Making things/handicrafts/models	9	21
Homework	9	2
Music/ballet/drama/speech	7	9
Housework/errands	7	2
Organised sport	6	8
Puzzles/games	6	4
Playing with animals	6	3
Shopping	5	-
Social time with adults	5	1
Excursions/events	5	-
Playing video games	4	4
Fantasy games/pretend play	3	10
Writing	3	9
Looking after other children	2	-
Club/organisation (Brownies/after school care etc.)	1	1
Listening to radio/CDS/records/tapes etc.	1	1
Paid work/earn pocket money	1	-
Extra tuition after school	-	1
Maths (not homework)	-	1

There were differences, consistently reported by both the children and their parents, in relation to family income, ethnicity and mothers' education, and certain out of school activities: home computer use, attendance at music, dance or drama classes, and handicrafts.

Computer usage as an after school activity was, as might be expected, strongly related to family ownership of a computer, and thus related to family income, and because of the lower incomes of sole parents, family type.

Thirty percent of parents with the highest incomes reported that their child spent time on the computer when not at school, compared with 17 percent of parents on middle incomes and 12 percent of those on low incomes. Twenty-four percent of parents in two-parent families reported that one of the things that their child spent most time doing was using the computer, compared with 13 percent of sole parents. Similar proportions of children reported that they generally used the computer when not at school (29 percent from the highest income families, 20 percent from middle income families and 11 percent from those in the lowest income bracket). Pakeha/ European parents, and almost identical proportions of Pakeha/European children, were more likely than Māori parents and their children to mention using the computer (24 percent compared with 10 percent).

Thirty-one percent of mothers with a university education compared with 25 percent with tertiary qualifications, 15 percent with trade qualifications and 9 percent with no qualifications mentioned their child's use of a computer after school, and 28 percent of children whose mothers had a university qualification said that they generally spent some time on the computer when not at school, compared with 14 percent of children whose mothers had no qualifications.

Mention of their child's involvement in aesthetic activities (ballet, music or drama), rose in accordance with family income (11 percent of parents in the higher income brackets compared with 2 percent in the lower income brackets). Nineteen percent of children from families in the highest income bracket said that they participated in aesthetic activities compared with 11 percent in the middle income bracket, 2 percent in the low income bracket and 6 percent in the lowest. More Pakeha/European children said that they generally participated in aesthetic activities than did Māori children (13 percent compared with 2 percent). Mothers with post-school qualifications were more likely to mention aesthetic activities as one of the three things that their child spent most time doing (13 percent compared with 4 percent of other mothers).

Twenty-four percent of parents with the highest incomes and 29 percent with the lowest income mentioned their child making things, compared with 15 percent of parents in the middle income bracket. Similarly, 19 percent of children from families in the highest income bracket said that they made things, compared with 11 percent of children from families in the middle income bracket and 4 percent in the low income bracket.

No Pacific Island children reported making things. Children whose mothers had university or tertiary qualifications were more likely to mention making things (18 percent each, compared with 6 percent of children whose mothers had a trade qualification and 5 percent who had a mid-school qualification).

Forty-three percent of parents with low incomes reported that their child spent time on art (drawing) compared with 21 percent of high income parents. High income parents were more likely to report that their child engaged in fantasy play than parents in the lowest income bracket (13 percent compared with 11 percent).

According to parents, fewer Pakeha/European children watched television than Pacific Island children or Asian children (36 percent compared with 54 percent and 73 percent). No Māori children reported doing puzzles, compared with an average 10 percent of children from other ethnic backgrounds. Forty-one percent of children from two-parent families, compared with 28 percent from sole-parent families, said that they spent most time when out of school playing with friends. More children from low income families said that they engaged in physical play (75 percent, compared with around 51 percent of children from each of the other income groups).

Boys were more likely than girls to report that they watched television, used the computer, played video games, made things, engaged in physical play or took part in organised sport. Girls were more likely than boys to say they did homework, read, took part in aesthetic activities, did art or drawing, played with animals, or went shopping.

Table 28

Gender and Children's Out-of-School and Weekend Activities at Age 8

Activity	Girls (n=248) %	Boys (n=275) %
Watch television	53	61
Play with friends	50	46
Physical activity	47	58
Homework	27	19
Reading	26	11
Music, ballet, drama	20	6
Eating/sleeping	19	19
Play with toys dolls, guns etc.	18	21
Use the computer	18	26
Social time with adults	18	14
Art/drawing	18	12
Housework errands	16	15
Organised sport	15	23
Excursions/events (e.g. concert)	14	15
Shopping	13	8
Play with animals	13	7
Puzzles/games	9	10
Club organisation (e.g. Brownies)	8	4
Church/Sunday school	7	4
Make things/handicrafts/models	7	16
Fantasy games/pretend play	5	3
Writing	4	3
Play video games	2	9
Look after other children	2	0
Cultural club/language lessons	1	1
Paid work/earn pocket money	0	2

As shown in the next table, parents and children reported similar proportions for watching television, playing with other children, and playing with toys. But they differed on other activities, with some interesting differences related to gender. The reports of girls' computer use tally—but parents emphasized it more for boys than boys do themselves. Girls emphasized reading more than their parents did—but this was reversed for boys.

Table 29

Parental and Child Reports of the Activities Girls and Boys Spend Most Time Doing at Home

Activity	Parents n=247	Girls n=248	Activity	Parents n=274	Boys n=275
Reading	27	50	Reading	23	12
Art/drawing	23	35	Art/drawing	20	8
Play with siblings/friends	40	34	Play with siblings/friends	30	39
Watch television	37	32	Watch television	47	47
Physical activity	32	25	Physical activity	48	45
Fantasy games/pretend	4	18	Fantasy games/pretend	3	2
Writing	6	17	Writing	2	1
Play with toys, dolls, guns etc.	15	16	Play with toys, dolls, guns etc.	20	18
Use the computer	12	15	Use the computer	29	18
Make things/handicrafts/models	6	15	Make things/handicrafts/models	26	12
Music, ballet, drama	11	15	Music, ballet, drama	4	4
Play with animals	8	4	Play with animals	3	4
Organised sport	2	3	Organised sport	13	10
Puzzles/games	7	2	Puzzles/games	6	6
Housework/errands	9	2	Housework/errands	2	5
Homework	10	2	Homework	2	8
Play video games	1	1	Play video games	7	6
Eating/sleeping	13	1	Eating/sleeping	2	11
Church/Sunday school	1	1	Church/Sunday school	0	0
Social time with adults	5	0	Social time with adults	2	6
Club organisation (e.g	2	0	Club organisation (e.g	1	0
Brownies)	3	0	Brownies)	0	0
Look after other children	4	0	Look after other children	0	6
Excursions/events (e.g. concert)	0	0	Excursions/events (e.g. concert)	0	1
Paid work/earn pocket money	5	0	Paid work/earn pocket money	0	5
Shopping			Shopping		

Parental Spare Time Activities

What did parents like to do in their spare time? As Table 30 shows, mothers are more likely to be doing gardening or housework, pursuing a literacy related activity such as reading, or doing something aesthetic or creative. Fathers are more likely to be engaged in a physical activity, taking part in a maths-science related activity such as playing board or computer games, pursuing a hobby such as collecting, and somewhat more likely to watch television or go to the movies.

Table 30

Parental Spare Time Activities

Activity	Mother (n=516) %	Father (n=446) %
Literacy-related activities	57	28
Routine housework/gardening/home etc.	42	27
Physical activities	39	56
Aesthetic/creative activities	27	3
Social-based activities	25	23
Watch TV/go to movies	19	25
Relaxation	16	9
Socio dramatic activities	8	7
Maths/science related activities	4	14
Study	4	1
Eat out	4	2
Church/community/club activities	4	3
Animals	3	3
Exploration/special events/trips/holidays	3	3
No spare time	3	2
Hobbies (unspecified)	1	8
Preschool/school-related activities	1	0

Mothers in the high income bracket were more likely to take part in physical activities than mothers in the lowest income bracket (48 percent compared with 28 percent). Forty-one percent of mothers in sole-parent families took part in social activities involving friends and family compared with 22 percent of mothers in two-parent families. Mothers in sole-parent families were also more likely to watch television or go to movies than mothers in two-parent families (33 percent compared with 16 percent). Fathers in the highest income bracket were more likely to take part in physical activities than fathers in the lowest income bracket (47 percent compared with 14 percent). Forty-nine percent of fathers in the highest income group spent their spare time working around the house and garden compared with 35 percent of fathers in the middle income group. Fathers in the highest income group were also more likely to take part in family based social activities than fathers in the middle income group (28 percent compared with 19 percent).

Forty-nine percent of mothers with either university, trade or senior school qualifications took part in physical activities compared with 27 percent of mothers with no qualifications. Mothers with a trade qualification were also more likely to take part in physical activities than mothers with a mid-school qualification (50 percent compared with 33 percent). Seventy percent of mothers with university qualifications took part in literacy related activities compared with 51 percent of parents with other post-school, mid-school or no qualifications. University educated parents were also more likely than parents with a trade qualification to watch television or go to the movies (28 percent compared with 13 percent).

Membership of Organised Groups

Children

Neither the study children nor their parents saw participation in organised group activities outside home or school as one of the three main things they did when not at school, but most children had joined a club or were taking part in some form of group activity (73 percent). Fifty-five percent of the study children were members of sports related clubs or groups, and 22 percent belonged to children's service clubs such as Brownies, Cubs, or Keas. Ten percent were taking part in performing arts groups, 8 percent in church groups, and 3 percent in ethnic or cultural groups. A few children had special interests in conservation or as collectors.

Eighty-one percent of boys belonged to a club compared with 64 percent of girls. This reflects the high membership of sports clubs amongst boys: 72 percent, double that for girls. Girls were much more likely to belong to arts groups (17 percent compared with 3 percent), and more likely to belong to uniformed groups (27 percent compared with 17 percent for boys).

Children from two-parent families were more likely to belong to a club than children from sole-parent families (76 percent compared with 58 percent). Children from families in the higher income brackets were more likely to be club members than children from families with lower incomes (77 percent compared with 64 percent) as were children whose parents did not receive state benefits (77 percent compared to 51 percent).

Fifty-one percent of the children who belonged to clubs or groups also had out-of-school lessons.

Around 60 percent of main caregiving parents and their partners belonged to some sort of organisation outside the home. As the following table shows, the proportion of mothers and fathers who were members of outside organisations was relatively equal. However, when it came to choosing an organisation there were some significant gender differences. Not surprisingly, given their dominant interest in physical activities, fathers were more likely to be members of sports organisations than mothers, and somewhat more likely to be members of professional or work related bodies. Twice as many mothers, 24 percent, belonged to voluntary or service organisations, compared with 12 percent of fathers. There were no gender associations regarding membership of social, church, cultural, arts or other special interest organisations.

Table 31

Parental Membership of Organisations Outside the Home: Men and Women Compared

Organisation	**Mother** (n=516) %	**Father** (n=446) %
None	38	39
Sports related	25	34
Service (voluntary/community/school)	25	15
Church related	13	12
Social	4	6
Children's organisations	4	2
Cultural/ethnic	3	2
Hobbies/collectors	3	5
Political/social action/union related	3	1
Arts performing—music, ballet, drama etc.	3	4
Arts, fine crafts	2	0
Professional organisations	2	5
Self improvement	2	1
Conservation	1	2

Fifty-three percent of mothers in the lowest income bracket did not belong to any organisation outside the home, compared with 37 percent of mothers in the middle income bracket and 34 percent of mothers in the highest income bracket. Mothers in sole-parent families were less likely to belong to an organisation outside the home than mothers in two-parent families (58 percent compared with 35 percent). There were no income related differences associated with fathers' membership of organisations outside the home.

Pacific Island parents were more likely to belong to church related organisations. Forty-three percent of Pacific Island mothers belonged to a church related organisation compared with 11 percent of mothers in other ethnic groups, and 50 percent of Pacific Island fathers belonged to a church related organisation compared with 11 percent of fathers in other ethnic groups. Only 1 percent of Pakeha/European mothers and fathers belonged to a cultural group compared with 14 percent of fathers and 11 percent of mothers in the other ethnic groups.

Mothers with university qualifications were most likely to belong to an organisation outside the home. Mothers with trade or mid-school qualifications were more likely to belong to a sports organisation than others.

Lessons or Coaching Outside School

Forty-nine percent of the children attended lessons or coaching outside school. Girls were more likely to go to lessons than boys (58 percent compared with 41 percent), and much more likely to go to arts lessons (40 percent compared with 16 percent). Performing arts (27 percent) and sport (26 percent) were the main lessons children had outside school. Only 4 percent attended lessons or coaching in school related subjects. Most of these children were rated by their teachers as below average or average overall. Three percent attended classes related to a particular culture or ethnic group and a small number had tuition in the fine arts.

Most after-school classes involve financial costs. Children from higher income families were more likely to go to lessons after school (54 percent) than were children from lower income families (31 percent).[40] Children from homes where a state benefit was or had been the main source of family income were less likely to have outside lessons than children from other families (40 percent compared to 54 percent).

Fewer children whose mothers had no qualifications went to lessons after school than did children whose mothers had senior or post-school qualifications (23 percent compared with 58 percent). Attending lessons outside school was also more likely for children whose parents wanted them to go on to tertiary study (53 percent compared with 44 percent of other children).

Parental Study

Twenty-five percent of mothers were engaged in some form of study, compared with 14 percent of fathers. Seventy percent of the mothers and half the fathers studying were working towards a tertiary qualification. Asian mothers were more likely to be studying than others (62 percent compared with 23 percent).

Table 32

Parental Study

Course	Female (n=516) %	Male (n=446) %
Polytechnic diploma or certificate	8	3
University level Bachelor degree	4	2
Personal interest/upskilling	4	1
Work-related on-job training	2	6
Child related e.g. playcentre course	2	1
University level diploma or certificate	1	1
Other qualifications—taxi/real estate/NZIM	1	1
University level postgraduate degree	1	0
College of Education diploma or certificate	1	0
NZ certificate or diploma	1	1
Aesthetic/arts	1	0
*Trade certificate or advanced trade certificate	0	0

* 4 parents, 2 male, 2 female, were studying for a trade or advanced trade certificate.

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[40] Reflecting this, we find that private school students were much more likely to have additional non-school lessons (78 percent compared to 46 percent of state school students and 53 percent of integrated school students),to play musical instruments or take part in musical groups (82 percent compared to 37 percent of state and integrated students), and to have a computer at home (93 percent compared to 70 percent of state and integrated students).

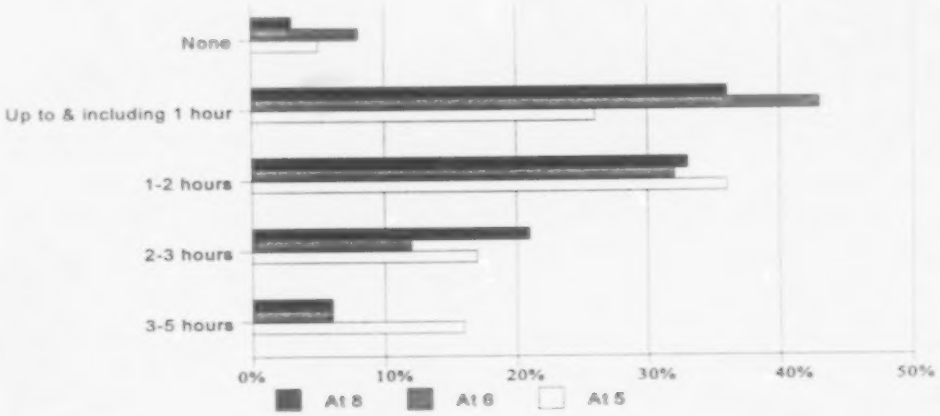
Music

Forty percent of the study children were reported by their parents to play a musical instrument or take part in a musical group. Most played a specific instrument (32 percent). Eight percent had joined a choir, and 3 percent played an instrument in an orchestra or cultural group. Fifty percent of girls played a musical instrument or participated in a musical group, compared with 30 percent of boys. Children from the lowest income group were least likely to play a musical instrument (18 percent, compared with 30 percent from low and middle income families, and 41 percent from high income families). Fewer children whose mothers had no or mid-school qualifications played a musical instrument or participated in a musical group than did children whose mothers had senior school or post-school qualifications (26 percent compared with 46 percent).

Television Watching

The average time spent watching television at age 5 was 2.65 hours a day, and at age 6 it had dropped to 1.26 hours a day. At 8 years the average viewing time had crept up again to around 1.88 hours a day.

Figure 5
Children's TV Watching on Weekdays



Parental estimates of the time their children spent watching television, with around 60 percent reporting viewing times of more than an hour a day, are similar to those reported for children of a corresponding age (standards 2 and 3) in the recent Third International Mathematics and Science Study[41]. However, in that study, 16 percent of the children were reported as watching television for much longer periods, in excess of 4 hours. The NZ On Air 1997 survey put the average for New Zealand children's television viewing between the ages of 5 and 9 at two hours per day.[42] That survey also found no differences between boys and girls regarding the amount of time spent watching television per day.

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[41] Garden, (1997) p. 149

Children from sole-parent families were more likely to watch television for longer periods. Thirty-three percent of children from sole parent families watched television for more than two hours, but less than three hours, compared with 19 percent of children from two-parent families. Differences in time spent watching television are linked to family income levels. We found a greater proportion of children from families in the highest income bracket watched television for up to one hour a day than did children from families in the middle and lowest income brackets (45 percent compared with 31 percent and 28 percent respectively).

Pacific Island and Māori children were more likely to watch more hours of television per day than Pakeha/European children. Forty percent of Pacific Island children and 27 percent of Māori children watched between two and three hours television per day, compared with 18 percent of Pakeha/European children.

Overall, children with mothers who had tertiary qualifications watched less television than those whose mothers had no qualifications (46 percent of those whose mothers had tertiary qualifications watched one hour or less a day compared with 28 percent of those whose mothers were unqualified).

Is it the amount of time spent watching television that matters, or do children who watch more television have fewer experiences? Children who watched more television than others were just as likely to enjoy reading. We found no differences related to belonging to clubs or groups or participation in music. But only 27 percent of the children who watched more than 3 hours television on an average day had lessons outside school, compared to 42 percent of those who watched between 2-3 hours, and 61 percent of those who watched an hour or less.

Children who watched television for up to one hour per day were more likely to do word processing than those who watched more than two hours but less than three hours, and more likely to do graphics than those who watched more than two hours.

We asked the children what programmes they had watched the night before we interviewed them. We also asked the children and their parents for the children's three favourite programmes. NZ On Air found that children aged 5-9 tended to stick with the TV2 channel[43] and we also found that TV2 programmes dominated the study children's viewing. The next set of tables show the types of programmes children had most recently watched.

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[42] NZ On Air (1997) p. 69

[43] NZ On Air (1997) p.84

Table 33

Programmes Watched by Children on TV/Video the Previous Night, as reported by Children

Programme	(N=523) %
Cartoons—unspecified/adult	40
Cartoons—children's/family viewing	36
Cartoons—children's adventure/sci-fi	22
Adult sitcoms/family viewing	21
Adult soap operas	18
None	16
News/documentaries/dramas/wildlife	15
Adult/family entertainment	10
Children's programmes (made for TV)	8
Movies/videos children's family viewing	7
Adult movies	5
Children's adventure/sci-fi/horror unspecified	4
Sports and sports related	3
Adult adventure/sci-fi/crime/mystery/horror	2
Movies/videos unspecified	2
Do not know	1

Children's programming is dominated by animated features which we have grouped as cartoons of various kinds. For example "The Simpsons" is classified as an adult cartoon, but is programmed in different time slots to attract both children and adults. It proved very popular with the study children. The IEA Third International Maths and Science Study also reports children's liking for cartoons, drama (soap operas), comedy, adventure or suspense genres.[44]

Parents and children are in broad agreement on which programme types are the children's overall favourites (cartoons and adult sitcoms) and on their liking for "soap operas". Fewer children than parents said that the children didn't watch television, or didn't have a favourite programme or programmes. Animated features made for children were the most popular choices for children. Children also professed a greater liking for adult sitcoms, adventure type programmes and movies classified as "family" viewing. Parents' views on the popularity of family type entertainment programmes such as game shows and documentaries were not borne out by their children.

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[44] Garden, (1997) p.150

Table 34

Children's Favourite TV Programmes (Parent and Child Responses compared)

Programme	Children's 3 favourite TV programmes (N=523) %	Parental view of their child's 3 favourite TV programmes (N=521) %
Cartoons—children's/family viewing	57	40
Cartoons—unspecified/adult	52	48
Cartoons—children's adventure sci-fi	31	19
Adult sitcoms/family viewing	22	17
Adult soap operas	14	11
Children's programmes (made for TV)	9	12
Children's adventure/sci-fi/horror unspecified	9	10
Movies/videos children's family viewing	8	3
Adult/family entertainment	8	13
News/documentaries/dramas/wildlife	7	11
Adult adventure/sci-fi/crime/mystery/horror	7	10
Adult movies	6	2
Sports and sports related	4	5
None	2	7
Movies/videos unspecified	2	3
Adult drama	1	1
Do not know	–	9
Other	–	1

Parents reported some significant differences between boys' and girls' programme preferences. Boys (54 percent) had a greater liking for cartoons generally than girls did (41 percent), for adventure/science fiction/crime/mystery (14 percent compared with 6 percent), and for sport (9 percent compared with 1 percent). Girls were more likely to watch soap operas than boys were (18 percent compared with 5 percent). They were also more likely to watch sitcoms (23 percent compared with 12 percent), and somewhat more likely to watch children's programmes made for television (17 percent compared with 9 percent).

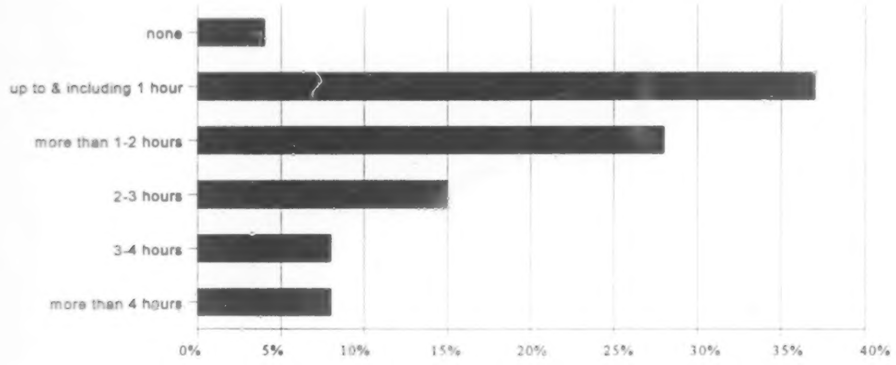
Although the proportions differ, the children's responses to the same question by and large mirror those of their parents. Boys had a greater liking for children's adventure/science fiction cartoons than girls (42 percent compared with 20 percent), and for adventure/science fiction/crime and mystery programmes (12 percent compared with 4 percent). They also had a greater liking for adult movies (8 percent compared with 3 percent) and for sports programmes (6 percent compared with 1 percent). Girls had decided preferences for soap operas (22 percent compared with 6 percent) and for sitcoms (30 percent compared with 15 percent). Girls were somewhat more likely to watch children's programmes made for television (13 percent compared with 6 percent of boys).

Parental Television Watching

Figure 6 shows the estimated daily hours that the main caregiving parent, chiefly the child's mother, spent watching television. The pattern of the amount of time spent watching television corresponds closely to the pattern of children's viewing reported by parents.

Figure 6

Average Daily Time Spent Watching Television: Main Caregiving Parent



Parents in the highest income group were more likely to watch television for up to one hour only per day than parents on the lowest incomes (43 percent compared with 10 percent). This may reflect, in part, the greater proportion of parents in the lowest income bracket who have no paid employment, and spend more time at home. No parents on the highest incomes watched television for more than four hours per day, compared with 8 percent of parents in other income groups.

Asian parents were most likely to watch up to one hour per day (69 percent, compared with 37 percent of Pakeha/European parents and 16 percent of Māori parents).Māori parents were more likely to watch television for more than three hours and less than four hours than parents in the other ethnic groups (25 percent compared with 7 percent).

Forty-eight percent of parents with university, tertiary and senior school qualifications watched television for up to one hour per day, compared with 32 percent of parents with trade or mid-school qualifications and 17 percent of parents with no qualifications.

Main caregiving parents who watched television for more than four hours a day were less likely to read a daily newspaper (24 percent) than those who watched television for up to four hours a day (54 percent).

News and current affairs dominated female and male viewing preferences. Otherwise there were a number of differences in the genres preferred by female and male viewers which echoed children's preferences. Fathers were much more likely to watch sport. Mothers had decided preferences for drama and soap operas. A higher proportion of mothers also watched "how to do it" programmes, including educational television, probably reflecting the greater numbers of mothers who were also engaged in some form of study. There were no associations between the length of time spent watching television and parents' favourite genres.

Table 35

Parents' 3 Favourite Television Programmes

Programme	Mother (n=516) %	Father (n=446) %
News, current affairs, documentaries	52	56
Drama (includes series drama)	35	14
Soap operas	33	7
Crime, mystery, horror	20	15
Sitcoms	14	12
Movies, videos, specified/unspecified	11	10
Adventure, science fiction, specified	8	13
Entertainment and talk shows	7	5
Hobbies and how do it/ETV	7	2
Sport and sports related programmes	4	40
Cartoons	1	2
Do not know	1	2
None, has not got a favourite/does not watch much TV	7	6
None, does not watch TV	4	6

Computer Use at Home

Family computer ownership at age 5 showed many associations with children's competency levels a year later when the children were 6, though computer ownership at age 6 did not.

Seventy-one percent of the study families had a computer at age 8 compared with 57 percent at age 6. This level of ownership is higher than that reported in the 1994 IEA study[45] and for New Zealand households overall.[46]

There were strong relationships between computer ownership and family income, family composition, and ethnicity, and to some extent mothers' education. Ninety percent of highest income families owned a computer, compared with 68 percent of middle income families and 45 percent of low and lowest income families. Seventy-six percent of two-parent families had a computer, compared with 46 percent of sole-parent families. A similar proportion of Pakeha/European families (76 percent) had a computer, compared with 45 percent of Māori families and 46 percent of Pacific Island families. Eighty-nine percent of households where the mother had qualifications at university level had a computer, compared with 77 percent of households where the mother had tertiary qualifications or senior school qualifications, 68 percent where the mother had trade qualifications, 67 percent where the mother had mid-school qualifications and 39 percent where the mother had no qualifications.

Among families with a computer, only 8 children (2 percent) were said by their parents to have made no use of it. Two children had regular access to a neighbour's computer.

Table 36 compares parents' and children's reports of children's home computer activities. Overall, the proportions are similar for most activities other than educational games (which children may classify as games), though parents generally report more use of the computer by children than do children themselves.

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[45] Fifty-two percent of the households of the 4911 children in standards 2 and 3, in the IEA study in 1994, owned a computer (Garden, 1997, p.146).

[46] Statistics New Zealand figures show that just under one quarter (24.8 percent) of New Zealand homes owned a PC in March 1996, up from 11.5 percent in 1989 (New Zealand Official Year Book (1997) p. 293).

Table 36

Children's Computer Use at Home: Parents' and Children's Responses Compared

Activity	Parents (n=372) %	Children (n=377) %
Games	78	88
Wordprocessing	44	33
Graphics/drawing	35	25
Educational games	45	21
CD Roms for information/projects	23	13
Homework/project	13	7
Nothing	2	4
Programme writing	0	2
Desktop publishing	3	1
Internet	2	1
E-mail/faxes	1	1

When we looked at individual children and their parents, we found some significant differences. Only 17 percent of parents were in agreement with their child on the use of the computer for homework. Twenty-four percent agreed on the use of CDS for information or projects, 41 percent for graphics or drawing and 45 percent for word processing, compared with 88 percent agreement on the child's use of the computer to play games.

There were some gender differences in parent reporting of what girls and boys did on the computer. Sixty-one percent of boys were reported to play games compared with 49 percent of girls. Girls were more likely to use graphics (33 percent compared with 18 per cent of boys) and somewhat more likely to do word processing (36 percent compared with 27 percent of boys).

Looking at the children's responses to the same question, we found that there were no differences between boys and girls regarding playing computer games generally. But there was a difference when it came to playing educational games. Looking at only those families which owned a computer, we found that more girls than boys said that they played educational games on the computer (26 percent compared with 17 percent). Girls were much more likely to use graphics than boys (34 percent compared with 16 percent), and do word processing (39 percent compared with 28 percent). Fathers were more likely than mothers to report helping their child with games on the computer.

Not surprisingly, the income differentials in family computer ownership led to differences in the proportions of children in each income bracket gaining computer experience, or doing particular things on the computer. But looking only at patterns of computer use among children who had a computer at home, we found the only differences were that children from the lowest income families with computers were less likely than others to use graphics packages, or play educational games. Parents in the lowest income bracket were less likely than other parents to work with their children on graphics or using CD-Roms. These patterns may indicate that the computers owned by the lowest income families tended to be older, with less power to run graphics packages, or with less user-friendly graphics packages, and without CD-Rom capability.

Eighty-one percent of parents in households with a computer said that they spent some time with their child at the computer. Just over half gave general technical support. Playing games with the children was the next most frequent activity for just under half of these parents.

Twenty-three percent helped with finding information for homework or projects, 20 percent lent a hand with word processing and 9 percent helped with graphics. One child was showing the parents what to do. While the growth in home PC ownership has been linked to the popularity of the Internet, only a handful of parents (10) and children (6) mentioned its use.

Parents were somewhat more inclined to play games with boys (33 percent) than with girls (24 percent), reflecting perhaps the gender preferences for games reported earlier.

Summary

At age 8, many children lead an active life outside school, with quite high rates of participation in other organizations, in activities such as sports, arts, and music, and lessons connected with them, and with increased access to computers. Television watching had increased from age 6, with strong preferences for cartoons and the other programmes which are screened after school and in the early morning at weekends to target children of this age-group.

Children's and parents' leisure activities show some connection with family resources, and with gender. The divide in resources that we described in Chapter 2 is apparent in relation to children's access to computers, and to clubs, music, and lessons outside school. Children from homes with less access to these wider experiences are more likely to rely on television as a source of experience and recreation. But gender too plays a part, with some clear parallels in parental and children's activities and membership of organizations. Sport is more a male than a female interest, and homecrafts, the arts, voluntary work, drama and soap operas are of more interest to mothers and daughters than to fathers and sons.

CHAPTER 6

AT SCHOOL

In this chapter we look at patterns of schools attended, and how these relate to family income. We report on the composition of the child's classroom, teachers' length of service, qualifications and professional development. We describe parents' perceptions of their child's attitude towards school, their satisfaction with their child's initial school progress, the factors which have a bearing on this, parent involvement with the school, and parent help with homework. We look next at teachers' perceptions of the children's school progress, including reading age, the children's areas of curriculum strength and weakness, aspects of their behaviour around the school, and teachers' perceptions of their contact with parents. We then turn to the children's own perceptions of their experiences at school, and the strategies they had for dealing with problems encountered in school work. Finally, we look at parents' aspirations for their child, and parental choice of secondary school.

Patterns of Schools Attended

Eighty-one percent of the study children were still in the same school they started in. Fifteen percent were at their second school by age 8, and 3 percent at their third school. Two children had attended 4 schools, 1 child 5 schools, and another child 7 schools, in their first 3 years of formal education.

Thirty percent of those attending private schools were at their second school, compared with 16 percent of those attending state schools and 9 percent of those attending integrated schools. Most of the children who had attended 3 or more schools were in state schools. There was no link between school decile and the number of schools attended by a child by age 8.

Thirty-six (13 percent)of the 281 children in the study at both age 5 and age 6 had changed schools since age 6. For 25 of these 36 children, the change of school came a result of shifting house. Differences in school discipline, or school or class size, were also a factor for 12 of the children.

The next table shows that while the schools attended by the study children at age 8 are reasonably representative of the Wellington region as a whole, the study children's attendance gave a slightly different pattern, with higher attendance at high decile schools and lower attendance at schools with high Maori enrolment. It also shows that the Wellington region tends to have more high decile schools, more integrated schools, and a higher proportion of full primary schools, than the country as a whole.

Table 37

School Characteristics

School Characteristics*	Sample (n=523)[47] %	Schools (n=168) %	Wellington Region (n=214)[48] %	National data (n=2244)[49] %
State	79	77	76	86
Integrated	15	17	17	10
Private	5	6	7	5
Decile 1–2	10	13	14	23
Decile 3–4	14	15	16	19
Decile 5–6	9	13	13	19
Decile 7–8	12	15	16	21
Decile 9–10	55	45	40	19
<8% Māori on roll	42	33	35	34
8–14% Māori on roll	27	25	20	17
15–29% Māori on roll	19	23	24	21
30%+ Māori on roll	12	19	22	28
Contributing	54	51	44	56
Full (incl F1–2)	43	46	52	40
Composite	3	3	4	4

* Percentages in each category may not add to 100 percent due to rounding.

Forty-seven percent of the children enrolled in decile 9–10 schools came from high income homes, as did around a third of those in decile 5–8 schools, compared with 15 percent of those in decile 3–4 schools, and 2 percent of those in decile 1–2 schools.

Seventy-four percent of the children attending private schools came from the highest family income homes, compared to 33 percent of those attending state schools, and 40 percent of those attending integrated schools. The mothers of children at private schools were slightly more likely than those of state school students to be in full-time employment.

Family income continued to be the major family characteristic associated with different patterns of school enrolment, as Table 38 shows.

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[47] 523 children attending 168 schools.

[48] Primary and composite schools only.

[49] Primary and composite schools only.

Table 38

Family Income and School Characteristics

Family income → School characteristic ↓	Over $60k (n=190) %	$30-60K (n=205) %	$20-30k (n=51) %	< $20K (n=62) %	sample (n=523)[50] %
State	73	82	84	94	79
Integrated	16	16	16	3	15
Private	11	3	0	3	5
Decile 1-2	1	13	22	16	10
Decile 3-4	5	15	18	24	14
Decile 5-6	7	9	10	7	9
Decile 7-8	11	13	20	18	12
Decile 9-10	66	48	31	32	55
<8% Māori on roll	57	33	20	18	42
8-14% Māori on roll	26	26	29	23	27
15-29% Māori on roll	10	20	35	31	19
30%+ Māori on roll	3	17	8	23	12
Contributing	44	58	59	71	54
Full (incl. F1-2)	50	41	41	27	43
Composite	6	1	0	2	3

Attendance

Almost all the children had good attendance records. Teachers reported only 1 percent as having poor attendance records and a further 5 percent only satisfactory attendance. Illness and poor health were the main reasons teachers gave for attendance being poor or only satisfactory, though family commitments were also mentioned, and one child did not like school at all.

Most children whose attendance was less than good at age 8 had had good attendance at age 6.

Classroom Characteristics

The median class size was 28 children, slightly up from the median of 26 at age 6. The smallest class size was 13, and the largest, 40. Thirty-five percent of children in schools with Māori enrolment of less than 15 percent were in classes of 25 or fewer, compared with 25 percent of children in schools with higher Māori enrolment. Sixty-four percent of the children attending private schools had classes of 25 or less, compared with 30 percent of children in state and integrated schools.

Sixty-nine percent of the children were taught in a composite class. Combinations of shared classrooms ranged from Year 2 upwards. Ten percent shared their classroom with at least three year levels, and 57 percent attended classes composed of two year levels, with most of these attending a class composed of Years 3 and 4 students (44 percent). Seventeen percent each (34 percent in total) attended classes made up of Year 3 or Year 4 only. A handful of children (7) attended composite classes made up of more than three year levels. Most, 92 percent, of the children's classes in high Māori enrolment schools were composite, decreasing to 55 percent of classes in very low Māori enrolment schools. Most of the children's classes in private schools were single-year (82 percent).

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[50] 523 children attending 168 schools.

Only 10 percent of the children were taught in open plan classrooms. Most (94 percent) had 1 teacher. Twenty-nine children (6 percent) had 2 classroom teachers, 1 child had 3 classroom teachers and another had 4 teachers. Four children attended a class other than their home class.

Children could expect to be with the same classmates for the year. Most classrooms (87 percent) were characterised by low pupil turnover. Eleven percent of teachers reported a pupil turnover rate of a quarter or less. Only 2 percent of teachers reported an annual classroom turnover rate of up to half the pupils. Turnover was least in schools serving a middle class community, and greatest in those serving a low socio-economic community, with high Māori enrolment.

Teacher Experience, Qualifications, and Professional Development

We interviewed each of the teachers of the children. Some children shared the same teacher. Unfortunately, we did not record the number of shared teachers, so the material on teachers is given in terms of number of teacher interviews. Twenty-two shared a classroom with another teacher and 2 taught with 2 other teachers, giving us a total of 547 teacher interviews.

Experience and Qualifications

Teachers' classroom experience ranged from less than 1 year to 30 years. A quarter of the teachers interviewed had taught for 2 years or less and 8 (1 percent) were completing their first year of teaching. Of the balance, 12 percent had taught for between 3 and 5 years, 22 percent for between 6 and 10 years, 14 percent for between 11 and 15 years and 27 percent had taught for over 15 years.

Decile 9–10 and private schools had fewer new teachers than other schools (19 and 21 percent compared with to 34 percent). Private schools had more teachers with more than 17 years experience (43 percent, compared with 23 percent of state schools, and 20 percent of integrated schools). Otherwise there were no differences related to school decile or type: decile 1–2 schools were just as likely to have very experienced teachers as higher decile schools were.

Sixty-seven percent of the teachers had other tertiary qualifications in addition to their teaching diploma.

Table 39

Teachers' Qualifications in addition to their Teaching Diploma

Qualifications	(n=547) %
Post graduate degree	2
Post graduate diploma ed/teaching	4
B. Ed	12
Other BA degree	25
Diploma below graduate level	18
Incomplete study for professional qualification	9
Sports and recreation qualification	3
Health and safety	2
Technical or skilled trade	2

Teachers who had 1 year's teaching experience, or 3-5 years' teaching experience, were more likely to have additional qualifications than those with over 10 years' experience.

Professional Development: School based

Over ninety percent of teachers had attended professional development courses arranged or initiated by their school in the past two years. Twenty-four percent had attended one course only, 16 percent two courses, 21 percent three, 16 percent four, 10 percent five, and 11 percent more than five and up to as many as thirteen different courses. Courses attended by teachers over the past two years are shown in table 40.

Table 40

Teacher Professional Development: School Based (over last 2 years)

Course	N=547 %
Curriculum related (core)	77
Curriculum related (non core)	41
Teaching methods	41
Assessment	21
Management/health and safety	20
None	9
Other	7

Courses were offered by a range of providers. In addition to those identified in table 41 below, teachers attended unspecified (shown as 'other') courses contracted by the Ministry of Education, courses run by the National Library, technology organisations, or health and welfare organisations, and courses run by their own professional bodies.

Table 41

Course Providers: School Based

Provider	N=547 %
Teacher support service	61
Other	44
College of education	33
Own school	16
Private provider	12
Sports organisation	6
University	4
Polytechnic	2
Local high school/community college	2

Workshop type courses predominated (70 percent), with 12 percent comprising both lectures and workshop delivery and 13 percent incorporating workshops, seminars and requiring completion of assignments. Nineteen percent of courses were run as meetings or seminars, 9 percent lectures, and 1 percent were courses requiring assignments and observations. Teachers were not always certain about the type of course attended: 30 percent replied "other" (not categorised) and a further 9 percent could say only that the course incorporated a mixture of delivery styles.

The length and duration of the courses attended varied from those covering little more than a day to those requiring regular attendance over an extended period of time.

Table 42

Teacher Professional Development: Duration and Length of Course Sessions Attended

Duration of course	N=547 %	Length of course session	N=547 %
Half day or less	17	Up to 1 hour	37
1 day to 1 week	55	Over 1 hour and up to 2 hours	32
Over 1 week up to 1 month	8	Over 2 hours and up to 3 hours	16
Over 1 month and up to 3 months	24	Half a day	14
Over 3 months and up to 6 months	20	Over half a day and up to 1 day	47
Over 6 months and up to 1 year	47	More than 1 day	26
Over 1 year and up to 18 months	1	Not specified	29
Over 18 months and up to 2 years	5	Other	2
More than 2 years	1		
Other	1		
Not specified	16		

Professional Development: Teachers' Own Initiative

Forty-seven percent of the children's teachers undertook professional development or related study at their own initiative. The most frequently mentioned courses were those to do with teaching methods (18 percent), personal self improvement (11 percent), sport (11 percent) and other courses such as those to do with interests or hobbies (e.g. photography), or voluntary work (e.g. victim support).

Two percent were completing a post- graduate degree, 5 percent post- graduate diplomas in education or teaching, and 2 percent other diplomas at post- graduate level. Eight percent of the teachers were studying for a Bachelor of Education degree, 4 percent were completing other bachelor degrees, 6 percent were studying for a diploma or qualification below graduate level and 1 percent were attending university for unspecified reasons. A further 5 percent had attended management courses. Course providers are shown in Table 43 below.

Table 43

Course Providers: Teacher Initiated Studies

Provider	N=547 %
College of education	15
Teacher Support Service	13
University	10
Local high school/community college	6
Private provider	5
Sports organisation	4
Polytechnic	2
Own school	1
Other primary school	1
Other	18

Workshops, and courses incorporating workshops with seminars or lectures, were the main course types attended. Course length and duration are shown in Table 44.

Table 44

Teacher Initiated Studies: Duration and Length of Course sessions Attended

Duration of course	N=547 %	Length of course session	N=547 %
Half day or less	7	Up to 1 hour	7
1 day to 1 week	19	Over 1 hour and up to 2 hours	9
Over 1 week up to 1 month	4	Over 2 hours and up to 3 hours	10
Over 1 month and up to 3 months	11	Half a day	6
Over 3 months and up to 6 months	6	Over half a day and up to 1 day	17
Over 6 months and up to 1 year	12	More than 1 day	18
Over 18 months and up to 2 years	2	Not specified	11
More than 2 years	5	Other	1
Other	1		
Not specified	8		

Parental Views of Children's School Experiences

Children's Attitude

As we found for the original study children at age 6, most of the 8 year old children were reported by their parents as enthusiastic about going to school (71 percent). Thirteen percent had mixed feelings, sometimes enthusiastic, sometimes not, and 9 percent were described as being matter of fact and simply accepting school attendance as part of their daily routine. Four percent had taken a while to settle but were now enjoying themselves. Two percent of the children were unhappy with school, and 1 percent were bored.

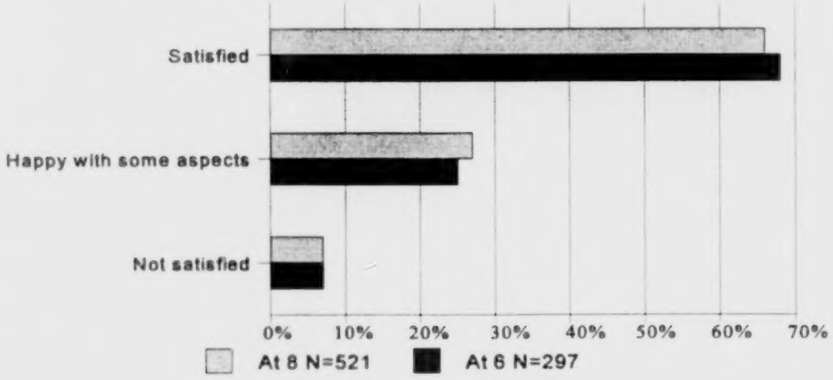
There were no differences in attitudes to school associated with maternal education, family income, ethnicity, or type of family. Girls were more likely to be enjoying school than boys (80 percent compared with 64 percent). Boys were more likely to have mixed feelings about school (17 percent compared with 9 percent of girls).

Parental Satisfaction With Their Child's Progress at School

Parental views on the children's progress at school at age 8 showed a similar pattern to the one found for the original study children at age 6.

Figure 7

Parental Satisfaction with Child's Progress at School



Parental perceptions of progress at age 6 had some bearing on their perceptions at age 8[51]. Those who had been satisfied at age 6 were most likely to continue to express satisfaction (70 percent, compared with 50 percent of those who had expressed dissatisfaction or qualified satisfaction). Six percent of parents who had been satisfied at age 6 were dissatisfied at age 8, as were 16 percent of those who had been dissatisfied or had mixed views at age 6. Mixed views at age 8 were slightly more likely among the latter groups.

Pacific Island parents were most likely to be satisfied with their child's school progress (86 percent, compared with 65 percent of Pakeha/European parents, 63 percent of Māori parents, and 64 percent of Asian parents). In contrast to our findings at age 6, there were no other differences associated with family characteristics. Nor did we find any differences related to school type, as we had at age 6, apart from a higher rate of satisfaction among parents of children in decile 1-2 schools (81 percent), and lower rates of having some reservations (15 percent for decile 1-2 parents compared with 29 percent for decile 3-10 parents).

Girls' parents were more likely to be satisfied with their child's progress (71 percent) than boys' parents (61 percent).

Parents who were not satisfied were usually dissatisfied because their child was not making sufficient progress at school (78 percent of those who were not satisfied). Parents who were happy with some but not all aspects also gave their child's lack of progress as the main reason for concern (54 percent of the group who had reservations).

Children's reported enthusiasm for school was matched with their parent's view of their progress. While 80 percent of the parents who were satisfied with their child's progress at school described their child as enthusiastic about school, only 36 percent of those who were dissatisfied did, and 58 percent of those who had mixed feelings.

Most, 92 percent, of the parents who were satisfied had a child who was reported by their teacher for this study as making average to excellent progress, compared with 75 percent of the parents who said that they were happy with some aspects of their child's education, but not other aspects, and 56 percent of the parents who said that they were not satisfied with their child's progress.

Similarly, 91 percent of the parents who were satisfied had a child whose reading age (as judged for us by their teacher) was above 8 years of age, compared with 75 percent of parents who were happy with some aspects of their child's progress and 58 percent of parents who were not satisfied.

Those who were not satisfied or who had mixed views also spoke of drawbacks in the school itself, such as class size, discipline, or the quality of the teachers (11 percent), the child being bored or not being extended (7 percent), or the child's unhappiness at school (2 percent).

These parents were much more likely than parents who were satisfied with their child's progress to have discussed academic or cognitive problems experienced by the child with the child's teacher (53 percent, compared with 21 percent of the parents who were happy with their child's progress).

Children's enjoyment of school and their parents' satisfaction were much the same for state, integrated, and private schools.

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[51] This comparison and others which follow are made of the original sample children only, i.e. those for whom we have full data for ages 5, 6, and 8.

Parents and Teachers

Most parents were comfortable in talking to the child's teacher about their child (89 percent). Only 2 percent (13 parents) were not, and another 7 percent (34 parents) were comfortable about some aspects, but not others. Parents who were uncomfortable talking to their child's teacher had all raised problems with the child's progress with the teacher. The only school characteristic associated with parental discomfort with the child's teacher was that their children were more likely to have attended 2 or more schools.

Just over half the parents (47) who felt uncomfortable, or who were not entirely comfortable when talking with the teacher about their child, said that this was because they lacked confidence in the teachers themselves. Others said that they did not know the teacher well enough, due to teacher changes (14) or their own situation (5). Three parents also felt that they lacked sufficient confidence to approach the teacher, and another felt inhibited through being a member of the school's board of trustees. There was little continuity of parents feeling uncomfortable with their child's teacher between the ages of 5, 6, and 8. This may indicate that such discomfort is related to the interaction parents have with individual teachers, and varies with the teacher.

Sixty-five percent of parents had worked with their child's teacher on problems encountered by their child. Most were positive about this joint work. Only 3 percent of these parents felt such problem sharing had not helped their child. The area most frequently approached this way was, as it had been at age 6, the child's happiness and social well-being—problems such as lack of confidence, or bullying (38 percent, much the same as the 34 percent at age 6). However, 32 percent of parents also talked with their child's teacher about the child's progress, compared with 25 percent at age 6. Their child's health problems were a concern for some parents (4 percent).

Some parents had resolved an unspecified problem, or had had the problem resolved by parent education (4 in each instance), and some parents (17) considered that there were problems but chose not to raise these with the child's teacher.

Half the parents who had not discussed a problem with the child's teacher at age 6 did discuss a problem at age 8, as did 76 percent of those who had discussed a problem at age 6.

Forty-three percent of sole parents said that they had had no problem to raise with the teacher, compared with 30 percent of parents who had a partner.

Parents of boys were more likely to say that they had worked together with their child's teacher on problems encountered by their child (71 percent, compared with 58 percent of girls' parents). Boys' parents were also more likely to say that they had discussed their child's experiencing academic or cognitive difficulties with the child's teacher (39 percent compared with 29 percent of girls' parents).

Parents in the lowest income bracket were less likely to discuss their child having academic or cognitive problems with their child's teacher than were parents in the low and middle income brackets (18 percent compared with 37 and 38 percent). They were just as likely as other parents to discuss their happines or social well-being, or health.

Parents with university or tertiary qualifications were more likely to discuss their child's social/emotional problems with the child's teacher than parents with mid-school qualifications (45 percent each compared with 29 percent).

Parental comfort in talking to their child's teacher, working on problems together, and the kinds of problems discussed with the teacher showed no clear differences related to school decile or school type.

Teachers' Relations with the Children's Parents

Teachers described their relationship with the child's parents in much the same way as they had at age 6, and in almost the same proportions: very good/excellent (45 percent); good (36 percent); satisfactory (12 percent); and difficult (1 percent). The partners of the 4 parents with whom the teacher thought she or he had a difficult relationship were never or only rarely seen by the teacher.

Almost half the parents who were not satisfied with their child's progress had relationships with the teacher that the teachers described as satisfactory at best, compared with 16 percent of those who were satisfied with their child's progress, and 20 percent of those who had mixed views.

There was considerable continuity in the quality of relationship between teacher and parent at age 6 and age 8 for those whose relationship at age 6 had been good or better, and in addition, most parents who had had a less than good relationship with the teacher at age 6 had good or better relationships at age 8.

Overall, teachers reported seeing the children's parents less often at age 8 than at age 6. Forty-three percent of teachers saw the child's mother regularly at age 8, compared with 63 percent at age 6. Six percent never saw the child's mother (3 percent at age 6). Similarly, 9 percent saw the child's father regularly, compared with 16 percent at age 6. There was no significant change in the proportion of fathers seen sometimes, regularly or not at all between ages 6 and 8. Eighteen percent of teachers reported seeing other caregiving adults, such as grandparents and other family members, or caregivers such as a nanny.

Only 12 percent of teachers saw both the child's parents on a regular basis. Twenty-six percent of fathers and mothers were sometimes seen by their child's teacher. Where teachers saw the child's mother rarely or not at all, it was unlikely that they saw the father very often, if at all. Where mothers were seen rarely, 36 percent of fathers were seen rarely and 47 percent were never seen, and where mothers were never seen, 64 percent of fathers were also never seen and a further 16 percent were rarely seen.

Teachers' reports of their frequency of contact with the children's mothers were not linked with differences in parental family income. When we looked at parental job status we found a similar pattern. There were no significant differences in the levels of contact the mothers had with their child's teacher, according to whether the mother worked or did not work in paid employment, or to the type of job held by the working mother.

The more highly the child's achievement was rated by their teacher, the more regularly the teacher saw the child's main caregiver, usually but not always the child's mother. Fifty-two percent of the children reported by their teachers to be making excellent or above average overall progress had mothers who were seen regularly by the teacher, compared with 38 percent reported as making average to medium progress and 31 percent reported as slow or below average. When mothers were seen less frequently or not at all there were no significant associations with children's reported level of achievement.

The importance of regular contact in developing a very good or excellent relationship between teacher and parent is reinforced by the fact that 62 percent of the parents with whom the teacher felt she or he had a very good to excellent relationship were parents who were seen regularly, compared with 32 percent of those with whom the relationship was good, and only 5 percent of those with whom the relationship was satisfactory.

Fifty-seven percent of the teachers thought that their relationship with the child's parents had had some effect on the child's school experience. Twenty-two percent of the children's teachers thought that parental interest secured the child's confidence in themselves; 20 percent said they gained useful knowledge about the child from their relationship with the parents; 22 percent mentioned joint work on children's problems; 19 percent said that they had a mutually supportive relationship and 13 percent simply said it was helpful without providing further comment. Only 3 percent thought the relationship had been a negative one.

There were no clear associations between the teachers' perceptions of their relationship with the parent, and their assessment of children's overall achievement.

Parental Involvement in their Child's School

Ninety-one percent of parents had some involvement with their child's school. Areas of involvement which parents reported having are shown in Table 45 below.

Table 45

Parental Involvement at Their Child's School at Age 8

Parental Involvement	(N=521) %
Voluntary work at school-classroom related	42
Other voluntary work at school	29
Irregular contact/very little	23
Board of Trustees/Parents' Association	13
Regular talks with teacher	11
No involvement	9
Attendance at school meetings and functions	8
Paid work at school	4
Respondent has no involvement but partner does	2

Most of the voluntary work in the classroom was done by mothers (96 percent) as the fathers who were also main caregivers were for the most part working in paid employment. Otherwise, parental involvement in school activities outside the classroom was not affected by the job status of the main caregiving parent. Sole parents were less likely to do voluntary work at the school (31 percent) than parents who had a partner living at home (44 percent).

Main caregiving parents in the middle income bracket were more likely to have no contact with the school than those on the highest incomes (13 percent compared with 3 percent), and main caregiving parents on low incomes were more likely to have only irregular contact with the school than those on the highest incomes (39 percent compared with 23 percent).

Asian main caregiving parents were more likely to have only irregular contact with the school than Pakeha/European parents (45 percent compared with 22 percent), and were the least likely to do voluntary work at the school (9 percent).

Parents who were not satisfied with their child's progress at school were much more likely to have regular talks with the teacher (28 percent, compared with 8 percent of parents with some reservations, and 10 percent of satisfied parents). Otherwise, patterns of parental involvement with the school were much the same in terms of parental satisfaction levels, parental comfort in talking with their child's teacher, and parents working with teachers on their child's problems.

Homework

Only 1 percent of the children did not get any homework. Almost all the parents (96 percent) said they gave their child help with some aspect of their homework. Sixty-four percent of the parents said that they gave help when needed or supervised the children's homework to make sure it got done. Half said that they helped out with spelling, 37 percent with reading and 25 percent with maths. Sixteen percent said that they lent a hand with projects and 10 percent provided resources.

Parents in the highest income bracket were more likely to mention providing resources than those in the low income bracket (13 percent compared with 2 percent). Mothers with a tertiary education were also more likely to say that they gave general help to their children than mothers with no or mid-school qualifications (60 percent compared with 38 and 42 percent respectively).

Parental help with homework was unrelated to the school decile or school type.

Teachers' Perspectives on the Children's Progress

Children's Overall Progress

Teachers described the overall level of achievement of the study children as follows: excellent or very good, 24 percent; average, but very good in some curriculum areas, 32 percent; average or medium, 29 percent; slow, 14 percent; minimal, 1 percent (this figure included a child with special needs). These judgements of children's overall level of achievement were strongly related with the children's performance on the task-assessed competencies, as well as the teacher-rated competencies (see p. 126-127).

At age 6, there were slightly more children whose progress was rated as excellent or very good (32 percent), and slightly fewer whose progress was rated as average but very good in some areas (22 percent).

There was substantial overlap between teachers' overall assessments at age 6 and their assessments at age 8, though few of the teachers remained the same. Consistency was greatest for the children described as very good/excellent.

Table 46

Teacher Assessments of Children at Age 6 and Age 8

Age 6 → **Age 8 ↓**	**Slow/ minimal (n=57) %**	**Average/ medium (n=83) %**	**Average/ very good (n=63) %**	**Very good/ excellent (n=98) %**
Minimal	2	2	1	
Slow	44	9	6	2
Average/medium	42	45	21	6
Average/very good	12	38	40	40
Very good/excellent		8	32	51

A higher proportion of boys than of girls was considered to be slow or below average (19 percent compared with 9 percent). Conversely, the proportion of girls considered to be making very good to excellent progress exceeded that of boys (29 percent compared with 19 percent).

At age 6, teachers' perceptions of children's overall progress reflected the children's family income levels. At age 8, there were no differences related to family income. Children whose mothers had no qualification were more likely than others to be seen as having an average level of achievement, and were 2–3 times less likely to be described as having a very good/excellent level of achievement. Pakeha/European children were somewhat more likely to be assessed as average but very good in some areas than Māori children (33 percent compared with 18 percent) and also more likely to be assessed as very good/excellent than Pacific Island children (24 percent compared with 14 percent).

Reading Progress

We asked teachers to estimate each child's reading age. Teachers reported the children as having a median reading age of between 9 years and 9 years 5 months.

More girls than boys were reported to have a reading age at or above the overall median (70 percent compared with 55 percent). Twenty-one percent of boys had a reading age of under 8 years of age, compared with 9 percent of girls.

Table 47

Teacher Estimations of Children's Reading Age

Reading Age	N=523 %
Below 7 years	3
7.0–7.5 months	5
7.6–7.11 months	8
8.0–8.5 months	11
8.6–8.11 months	11
9.0–9.5 months	13
9.6–9.11 months	11
10.0–10.5 months	8
10.6–10.11 months	8
11.0–11.5 months	6
11.6–11.11 months	4
12.0–12.5 months	3
12.6–12.11 months	3
13 years and over	5

Teachers' estimates of children's reading ages were reasonable indicators of their rating of the child's overall progress across the curriculum. Fifty-two percent of children assessed as making very good to excellent progress had a reading age of above 11 years, compared with 21 percent of children whose achievement was described as average to very good in some areas, 5 percent with average to medium achievement and 1 percent whose achievement was described as slow or below average.

Children making average to very good progress were more likely to have reading ages of between 9 and 11 years than those whose overall progress was average to medium, or slow, below average or minimal (58 percent compared with 36 percent and 9 percent respectively).

Children making average progress were more likely (44 percent) to have a reading age of between 8 and 9 years than children making slow, below average or minimal progress (30 percent), those assessed average but very good in some areas (14 percent), or those assessed as very good/excellent (1 percent).

Children with a low rate of progress were most likely to have reported reading ages of between 7 and 8 years (44 percent, compared with 15 percent of children with average to medium achievement, 6 percent average to very good, and 2 percent very good to excellent).

Children's Curriculum Strengths and Difficulties

Table 48 gives teachers' perceptions of the study children's curriculum strengths and weaknesses, compared with those reported at age 6. Few children at ages 6 or 8 were seen as having no areas of strength, but at age 8 nearly two-thirds of the children were seen as having some particular area(s) of difficulty in the curriculum, compared with just under half the children at age 6.

More children at age 8 are reported by their teachers to have strengths in reading and spelling. Otherwise there have been no significant changes in teachers' overall perceptions of the children's curriculum strengths. Other significant changes from when the children were aged 6 are the increases in the number of children having difficulty with maths, and with spelling, and a decrease in the number having difficulty with oral language.

Table 48

Children's Areas of Strength and Difficulty in the Curriculum: Ages 6 and 8 Compared

Curriculum Area	Strength %		Difficulty %	
	When child aged 6 (N=297)	When child aged 8 (N=523)	When child aged 6 (N=297)	When child aged 8 (N=523)
Mathematics	48	44	9	24
Reading	43	54	28	17
Story writing	35	40	26	24
Other writing—letters/reports	-	18	-	12
Art or music	32	33	5	4
Drama	-	12	-	2
Oral language	26	31	14	9
Physical education	26	32	8	8
Handwriting/printing	20	17	15	19
Science	19	23	2	2
Spelling	12	22	14	24
Social studies	11	16	2	3
Technology	-	15	-	1
Health	-	5	-	1
Te Reo	-	4	-	1
Religious studies	-	2	-	1
Nothing	5	3	45	36

There were a number of significant differences between girls and boys in teachers' assessments of their curriculum strengths. The next table compares teachers' assessments at ages 6 and 8. It shows that girls at age 8 were considered proportionately to have greater strengths in reading, story writing and other writing, spelling, oral language, music and art. Boys at age 8 were seen to have greater strengths in maths, science, technology and physical education. Only in a small number of non-core subject areas were there no significant differences related to gender.

Table 49

Children's Areas of Curriculum Strength: Boys and Girls Compared

Curriculum Area	Girls when aged 6 (n=135) %	Girls when aged 8 (n=248) %	Boys when aged 6 (n=163) %	Boys when aged 8 (n=275) %
Reading	57	63	32	47
Story writing	49	54	23	26
Music/art	39	40	25	27
Oral language	30	36	23	27
Spelling	20	30	6	14
Maths	36	30	58	56
Other writing	-	25	-	12
Physical education	22	21	29	43
Handwriting/printing	28	20	13	14
Social studies	13	18	10	15
Drama	-	13	-	11
Science	13	13	10	33
Technology	-	9	-	22
Health	-	8	-	3
Te Reo	-	4	-	4
None	-	3	-	2
Religious studies	-	2	-	1

The pattern for children's areas of curriculum difficulty showed these patterns in reverse for boys, with the addition of handwriting, but similar proportions of girls and boys were said to have difficulty with science and technology. Overall, girls were perceived as having fewer difficulties: 46 percent of girls were considered to have no difficulties at all, compared with 26 percent of boys.

Curriculum Areas and General Progress

The next table shows strengths in relation to overall school progress at age 8.

Table 50

Children's Areas of Strength in Relation to their Overall School Progress

Overall progress → **Curriculum area ↓**	**Minimal/ very slow (n = 6)** %	**Slow/ below average (n = 73)** %	**Average/ medium (n = 151)** %	**Average but very good in some areas (n = 168)** %	**Very good/ excellent (n = 125)** %
Overall progress	*1*	*14*	*29*	*32*	*24*
Reading	50	18	42	63	80
Maths	17	21	36	45	67
Story writing	17	16	25	45	66
Spelling	0	3	11	19	50
Oral language	0	18	21	34	48
Other writing	0	4	9	18	38
Music/art	0	30	34	35	31
Science	0	21	17	26	31
Social studies	0	3	12	17	30
Physical education	33	45	40	24	26
Handwriting/printing	33	10	13	19	22
Technology	0	21	7	18	20
Drama	17	10	11	13	13
Health	0	0	2	6	12
Te Reo	0	6	5	2	5
Religious studies	0	0	3	3	0
None	33	10	3	1	0

The trend shows a close match between children's curriculum strengths and the teachers' assessments of their overall achievement. Children assessed as making very good/excellent progress by their teachers were said to have strengths in most areas, followed by children assessed average to very good, then children assessed average and so on.

The exceptions are physical education and technology. Among those assessed as making slow and average progress, physical education is the dominant strength (45 percent and 40 percent respectively), compared with 24 percent among children assessed average to very good in some areas and 26 percent among children assessed very good/excellent. A higher proportion of children assessed as making slow to below average progress were seen to be stronger in technology than those assessed as making average to medium progress.

The pattern reverses itself for curriculum areas of difficulty: children assessed as having minimal, slow or below average achievement are seen to have the greatest difficulty in all the core curriculum areas, except computer technology, and those with the highest achievement the least difficulty. There is little relationship between teachers' assessments of children's overall achievement and reported difficulties with computer technology and all the non-core subjects.

Teachers' views of children's strengths at age 6 and age 8 showed the greatest continuity for reading (76 percent). Around half the children who were seen to have strengths at age 6 in mathematics, story writing, music/art, oral language and spelling were also seen to have strengths at age 8. There was very little continuity for other areas. Only a few children seen as having a strength in a given area at age 6 were seen as having difficulties in that area at age 8.

Around half of the children seen to have difficulty in a particular curriculum area at age 6 were seen to have the same difficulty at age 8, except for physical education, music/art, science and social studies.

Children's Behaviour

Teachers' descriptions of children's behaviour at school are somewhat different at age 8 from age 6. They put more emphasis on maturity, courteousness and politeness. Fewer children were described as reliable, willing, or trying hard.

Table 51

Teachers' Views of Children's Non-curriculum Strengths: Ages 6 and 8 Compared

Strength	When child aged 6 (N=298) %	When child aged 8 (N=523) %
Well behaved/courteous/polite	-	45
Kind/warm-hearted	55	42
Mature	26	40
Outgoing	31	30
Reliable	43	29
Willing	46	20
Tries hard	43	19
Organised	19	19
Sense of humour	-	12
Leader	14	10
Creative/inventive	-	8
None	3	2

Children assessed as making very good/excellent progress were more likely to be described as mature, independent, confident or articulate than those assessed as average but very good in some areas, average and slow or below average (60 percent compared with 45, 30 and 19 percent respectively). They were also more likely to be described as leaders than children assessed as being slow or below average(14 percent compared with 4 percent) and more likely to be described as organised than children assessed as average or below average (27 percent compared with 13 and 11 percent respectively).

Having an outgoing nature was more likely to be attributed to children assessed as slow or below average (44 percent) than to those assessed as average (31 percent) or those assessed as very good/excellent (24 percent). Similarly, children assessed as slow or below average or average were more likely to be described as willing (29 percent) than those assessed as very good/excellent (10 percent). However, the attribute of 'trying hard' was more likely to be assigned to those assessed as very good/excellent (24 percent) than to those assessed as slow or below average (12 percent).

Girls were seen to be more warm/kind-hearted than boys (47 percent compared with 36 percent), more mature (45 percent compared with 36 percent), more reliable (35 percent compared with 25 percent), and more organised and less easily distracted (21 percent compared with 16 percent).

The only association with family characteristics was that children whose mothers had no qualification were less likely to be described as mature, confident, or independent.

The greatest consistency between age 6 and age 8 was for those described as kind, warm, or tolerant (47 percent), followed by those described as mature or reliable. Consistency between the two ages was lowest for those described as leaders at age 6 (only 14 percent of these children were again described as leaders at age 8).

As the next table shows, teachers remained disinclined overall to describe weaknesses in the children's behaviour, manner, or approach to life. The main drawbacks seen in the study children were poor work habits, immaturity or being easily led, being shy, too dependent, or lacking in self-esteem: reversals of teachers' views of desirable behaviour.

Table 52

Teachers' Views of Children's Non-curriculum Drawbacks/Weaknesses

Drawback	When child aged 6 (N=298) %	When child aged 8 (N=523) %
Poor work habits	-	26
Passive (shy, too dependent)	26	22
Poor self-concept/low self-esteem/insecure	18	18
Self-centred/wilful	16	14
Immature	-	14
Aggressive	9	11
Will not try	7	7
Lives in own world	5	5
Impatient	13	4
Bossy	-	3
Unreliable	7	2
Spoilt	1	-
Lacks friends	7	24
None	28	-

Children assessed as making slow or below average progress were more likely than those assessed as making very good/excellent progress to be described as lacking in self esteem (25 percent compared with 12 percent) and as aggressive (18 percent compared with 6 percent). Children assessed as very good, excellent, or very good in some areas were less likely than those assessed as being slow or below average to be described as immature or easily led astray (10 and 8 percent respectively, compared with 25 percent).

When it came to less desirable behaviours, boys were more likely to be seen as having poor work habits than girls (37 percent compared with 14 percent). Girls were more likely to be seen as passive (27 percent compared with 17 percent). Overall, more girls than boys were thought to suffer no drawbacks related to behaviour or attitude (28 percent compared with 19 percent).

There was little consistency between age 6 and age 8 of teacher views of children's drawbacks. The highest was for passivity, with 29 percent of those described as passive at age 6 being again described as passive at age 8.

Children's Perceptions of their Classrooms

The *My Class Inventory(MCI)* 5 subscales provide an indication of children's perceptions of their classrooms in relation to its degree of competitiveness, the difficulty of the work, general enjoyment (satisfaction), friction between children, and friendliness between children (cohesion). The MCI is mostly used to provide a picture of classrooms as a whole, and given to all children in a classroom. Few of our children were in the same class as each other at age 8, so our use of it here is to gain some idea of how individual children experienced their classrooms.

The next table gives the overall responses to each item, grouped by subscale. Most children were positive about their classrooms. They perceived them as largely enjoyable, though not for every child in the class. Around half found their schoolwork demanding. Most children experienced some competition with others. A third of the children noted some fighting in their classrooms. Most children had some friends in their classroom, or felt that their classroom was a friendly environment.

Table 53

Children's Perceptions of Their Classroom Using the My Class Inventory

	(N = 522) %	Mean score (out of 15)[52]
Satisfaction		11.89
The children enjoy their schoolwork in my class	85	
Some children are not happy in my class	71	
Children seem to like my class	90	
Some children don't like my class	52	
My class is fun	94	
Friction		9.87
Children are always fighting with each other	34	
Some of the children in our class are mean	69	
Many children in our class like to fight	32	
Certain children always want to have their own way	74	
Children in my class fight a lot	35	
Competitiveness		11.31
Children often race to see who can finish first	51	
Most children want their work to be better than their friend's work	48	
Some children feel bad when they do not do as well as the others	72	
Some children always try to do their work better than the others	69	
A few children in my class want to be first all of the time	75	
Difficulty of work		7.92
In my class the work is hard to do	50	
Most children can do their schoolwork without help	84	
Only the smart children can do their work	29	
Schoolwork is hard to do	43	
Most of the children in my class know how to do their work	92	
Cohesiveness		10.10
In my class everybody is my friend	38	
Some people in my class are not my friends	78	
All children in my class are close friends	67	
All of the children in my class like one another	49	
Children in my class like each other as friends	80	

School was more demanding, and classrooms friendly, but with some fighting, for children from low income homes, attending low decile schools. Friction, difficulty and cohesiveness means were higher for children in low decile schools.[53] Children in the lowest income group had lower means for satisfaction and cohesiveness, and with children in the low income group, higher means for difficulty of work. Children from high income homes had lower means for friction. Children whose mothers had no qualification had higher means for friction and difficulty. Māori and Pacific Island children had higher means for difficulty and cohesiveness. Boys had higher means for difficulty, and lower means than girls for friction. Children attending private schools had higher means for competitiveness.

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[52] Each MCI subscale is scored out of 15, with a maximum of 3 for each item if the child agrees with it. "Reverse" items (e.g. the items "some children are not happy in my class" and "some children don't like my class" are given a 1 if children agree with them. A score of 15 would indicate a high level of the subject of each subscale.

Children's Responses to Difficulties in Their Work

The next table compares children's responses to difficulties in their work at age 6 and age 8.

Table 54

Children's Responses to Difficulties in Their Work at Age 6 and Age 8

Response	Reading %		Writing %		Maths %	
	When aged 6 (N=298)	When aged 8 (N=523)	When aged 6 (N=298)	When aged 8 (N=523)	When aged 6 (N=298)	When aged 8 (N=523)
Request help from teacher	27	24	27	25	29	28
Request help from peer	20	21	10	11	30	19
Keep trying	11	7	19	17	22	48
Sound letters out	27	42	25	16	-	-
Choose something easier	10	6	2	1	9	3
Use contextual strategy	9	11	-	-	-	-
Do something else	2	1	3	1	3	0
Look at dictionary/words on wall	3	-	22	46	-	-
Get a calculator	-	-	-	-	-	5
Give up/wait for teacher/do not know	2	2	2	2	7	4
Never have a problem	1	1	0	1	2	4

There were some, but not many, differences in children's responses related to gender, family, or school.

Girls were more likely than boys to seek help from a teacher if they struck a problem with reading or mathematics. Boys were more likely to say they had no problems with mathematics (7 percent compared to 2 percent of girls).

Children from high income homes were more likely to use a dictionary, or look at words on the wall to help with their writing. Children whose mothers had no qualification were most likely to seek help from a peer with their writing. Mäori children were less likely to persist with a writing problem. Children whose English was a second language were less likely to use sounding out strategies if they struck writing problems, and less likely to turn to a peer for help with mathematics.

Children in low decile schools were more likely to request help from a peer if they struck problems in their writing, and less likely than others to request help from a teacher if they struck problems in their reading.

At age 6 we found some consistency between children's approaches to problems in their work and their scores on the relevant assessments we used; but at age 8, we found no links.

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[53] Teachers in decile 8–10 schools described fewer children as aggressive in terms of any personal drawbacks (8 percent compared to 14 percent).

There was little consistent pattern between children's approach to problems in writing at age 6 and at age 8, though children who used dictionaries or words on the classroom walls at age 6 were more likely to use the same approach at age 8, as were those who requested help from teachers and peers at age 6.

As with approaches to problems in mathematics, children who used passive or evasive approaches to writing at age 6 were using more constructive approaches at age 8.

Future Education

At age 5, 29 percent of the children's parents wanted them to have a tertiary education. At age 6, this increased to 45 percent; at age 8, there was a further increase to 54 percent. Fifty-four percent[54] wanted them to go *"as far as they could"*, an increase from 45 percent at age 6. Only 5 percent settled for the end of secondary school, and 1 percent for School Certificate.

The main obstacles that might stop children from getting the education their parents would like them to have were lack of money (38 percent), and the child's own choice (26 percent, down from 37 percent at age 6). Thirty percent of the parents could think of nothing that would stop their child's education. Eight percent mentioned their child's attitude or temperament. Other reasons given by 2–3 percent each of the parents were changes of government policy, health problems, the child's ability, the possibility of pregnancy, unresponsive teachers or curriculum, and the unavailability of a suitable course.

Children whose parents hoped they would continue their education at the tertiary level were more likely to be taking out-of-school lessons (53 percent, compared with 44 percent of other children). Otherwise, we found no differences related to belonging to clubs or groups, enjoyment of reading, membership of a public library, amount of television watching, or the kind of help their parents gave them with their homework.

Forty-three percent of the families were saving for their child's education after primary school. Ability to save for their child's future education was dependent on income levels. Fifty-one percent of the high income parents were saving for their child's later education, as were 41 percent of the middle income group, 39 percent of the low income group, and 27 percent of the lowest income group.

Parents of children attending private schools were more likely to want them to have a tertiary education (74 percent compared with 52 percent of state school students, and 58 percent of integrated school students), and to be saving for their child's education after primary school (63 percent compared to 42 percent of state school students, and 45 percent of integrated school students). This reflects the high proportion of children from high income families among those attending private schools.

Choice of Secondary School

At age 5, 37 percent of the parents had decided which secondary school their child would enrol in, and at age 6, 39 percent. By age 8, 46 percent had made a choice, and 16 percent were considering two or more schools. Thus many parents were thinking about secondary school choices 4 years ahead. Only 1 percent of the parents thought they had only one secondary school available to them.

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[54] Some parents gave more than one goal.

The four main factors involved in parents' secondary school choice remain the same between age 5 and age 8, but their proportions change, as the next table shows. Reputation, proximity to home, previous family attendance, and the type of school remain the most important factors.

Table 55

Factors in Parental Choice of Secondary School

Reason	Percentage of those already decided		
	When child aged 5 (n=115) %	When child aged 6 (n=115) %	When child aged 8 (n=240) %
Reputation	63	68	64
Proximity to home	48	61	58
Previous family attendance	41	43	44
School type	32	36	41
Curriculum/activities	14	15	25
Discipline/school climate	11	14	15
Peer group/friends	0	12	12
School/class size	9	9	11
School mix	–	–	6
School facilities	10	10	5
Cost	5	6	5

Parents considering two or more schools had a slightly different set of the four main factors. Previous family attendance was less important (18 percent), as was proximity to home (35 percent).

As at age 6, we also found that parental decisions about secondary schools could change over time. Of those who gave us the school they had decided at age 6, 18 percent were now undecided, and 13 percent were considering another school as well. Thirty-six percent of those who were considering several schools at age 6 were still considering several schools, while 39 percent had decided on one school, and 24 percent were now undecided. Fifty-seven percent of those who had made no decision at age 6 were still undecided at age 8, but 33 percent of this group had made a decision, and 10 percent were considering several schools.

The next table shows the characteristics of the actual secondary schools named by parents as their desired school, or a school they are considering. If we take early parent interest as an indication of desirability, and note that reputation is one of the two main factors behind parental decisions 3 years before they need to make this decision, then this clearly shows a preference for high decile, low Māori enrolment schools, which tend to be larger than others, and situated in urban areas. This is a preference which cannot be met for all children, given the limited number of such schools, even in the Wellington region.

Table 56

Characteristics of Secondary Schools Already Chosen or being Looked at by Children's Parents

Characteristics	Parental choice age 8 (n=240) %	Wellington Region secondary schools (n=38) %	National secondary schools (n=336) %
Affiliation			
State	63	68	77
Integrated	26	27	19
Private	11	5	4
School Decile			
1	0	3	7
2	7	8	12
3	2	5	11
4	1	10	15
5	7	10	15
6	6	13	13
7	1	3	11
8	9	10	5
9	22	16	8
10	44	21	5
Roll Size			
100–199	1	3	5
200–299	3	11	10
300–499	11	22	22
500–750	31	22	24
750+	53	38	38
Proportion of Māori Enrolment			
<8%	43	29	33
8–14%	37	29	20
15–29%	17	34	25
30%+	3	9	22

Parents of a third of those currently enrolled in private schools would like to enrol their child in a private secondary school, as would 5 percent of those with children currently enrolled in state or integrated schools. All the state and integrated schools chosen by parents whose 8-year-old was in a private school were decile 9–10 schools.

Eighteen percent of the parents whose children were currently enrolled in schools serving a mainly low income community had decided on a decile 1–2 secondary school, but 31 percent of this same group had chosen a decile 9–10 school. Decile 9–10 schools were the main pick of parents whose children attended primary schools other than those serving a mainly low income community.

Parents who chose integrated secondary schools were more likely to have their children currently in decile 1–2 or decile 5–6 schools. Sixteen of the 24 current state school parents thinking of turning to private schools came from decile 9–10 schools, and 4 from decile 7–8 schools.

Summary

At age 8, the majority of the children remained at the same school they started in. Only 6 percent of the children had less than good attendance, mainly due to illness. There was no pattern of persistent poor attendance between age 6 and age 8.

Changes of school were mainly due to the family changing house. Other reasons were to seek smaller classes, better discipline, or more individual attention. Private schools offered smaller classes, and children attending private schools were more likely to be at their second school. The median class size was 28 children, up slightly from the median class size of 26 at age 6.

Three-quarters of the children had teachers who had taught for more than 2 years. Most teachers continued their professional development through school-provided courses, and almost half were undertaking some relevant study on their own initiative.

Seventy-one percent of the children were reported by their parents to be enthusiastic about school, 13 percent had mixed feelings, and 3 percent were unhappy or bored. Enthusiasm was reported to be lower for the children whose parents were not satisfied with their progress, or who had mixed views. The main reason for parents' lack of satisfaction was their child's slower than expected progress at school. Other factors were class size, the child's boredom or lack of extension; discipline, and the quality of the teacher. Parents who were not satisfied or who had mixed views were more likely than satisfied parents to discuss their child's academic work with the child's teacher, but they were less likely to have regular contact with the child's teacher. The teachers were also more uncomfortable with the parents of children who were not doing so well in school than with satisfied parents.

The majority of parents were comfortable talking to their child's teacher. Those who were not had nevertheless all raised questions about their child's progress with the teacher. Sixty-five percent of the parents had worked with their child's teacher on problems encountered by the child—38 percent related to the child's happiness and social well-being, and 32 percent to their academic work.

There was less contact between parents and teachers at age 8 than at age 6. Parents whose children were doing well were more likely to have regular contact with the teacher.

Parents of boys were less satisfied with their progress, and more likely to work with the teacher to resolve academic problems. Boys were less likely to be reported as enthusiastic about school. Teachers also rated girls more highly on their overall progress. Girls were more likely to be seen by teachers as having strengths in literacy, music and art, and boys in mathematics, science, technology and physical education.

There was considerable consistency in overall assessments by teachers of children's progress between ages 6 and 8, particularly for children categorized as making very good/excellent progress at age 6, and for children seen as strong at reading at age 6.

Academic progress was associated by teachers with maturity and independence, and trying hard. There was less consistency across the years in teachers' descriptions of children's behavioural and attitudinal strengths and weaknesses than in assessments of their academic progress.

Most children were positive about their classrooms. They perceived them as largely enjoyable, though not for every child in the class. Around half found their schoolwork demanding. Most children experienced some competition with others. A third of the children noted some fighting in their classrooms. Most children had some friends in their classroom, or felt that their classroom was a friendly environment.

Children's problem-solving strategies for reading showed more emphasis on sounding letters out at age 8 than at age 6. However, for writing, fewer children used sounding out words to help them, and more used dictionaries. In mathematics, children were more persistent with problems they encountered, and less likely to turn to each other for help.

Fifty-four percent of the children's parents now wanted them to have a tertiary education.

Money and the child's own choice were the main obstacles seen. There was little relation between children's activities and their parents' educational aspirations for them.

Sixty percent of the parents had thought about the secondary school they would like their child to attend. School reputation, proximity to home, previous family attendance, and the type of school, particularly high decile schools, remain the most important factors in parental selection of secondary schools.

SECTION II - ANALYSIS

CHAPTER 7

CHILDREN'S COMPETENCIES AND THEIR EARLY CHILDHOOD EDUCATION EXPERIENCE

In this chapter we analyse the associations between the children's competency levels and their length of early childhood education experience (for all children), and the early childhood education experience (for the original study children), which was described in some detail in the report *Competent Children at 5—Families and Early Education.*

Age of Starting Early Childhood Education[55]

The advantages to children of starting to attend early childhood education (ECE) before they are two years old increase as the study children grow older. There are more associations, and they are stronger, as the next table shows.

Table 57

Associations between ECE Starting Age and Children's Competency Scores at age 5, 6 and 8

	age 5	**age 6**	**age 8**
Motor skills	+		
Communication		+	+*
Logical Problem-Solving		+	+*
Literacy			
PAT reading comprehension			+
Reading age			+
Curiosity			+

+ = association between ece starting age & competency

*Stronger associations starred.

Children who started ECE before the age of 2 generally scored 6-7 percentage points more than children who started after the age of 2 for each of 5 competencies: Motor Skills, Communication, Logical Problem-Solving, Literacy[56] and Curiosity. Their overall advantage on the composite competency measure was 3-4 percentage points. There was no difference between children who started ECE before the age of 1 year, and those starting in their second year.

As the next chapter describes, family income and maternal education are the two major factors influencing children's competency levels. Because children from higher income homes and those whose mothers had tertiary or university education tended to start ECE earlier than others, we included these factors in further analysis of children's ECE starting age.

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[55] This analysis was done for all 521 children in the study at age 8.

[56] The Literacy competency had 1 measure at age 5, 2 at age 6, and 4 at age 8.

After taking family income at age 8 into account,[57] we continued to find that children's ECE starting age made a contribution of its own to the levels of children's competencies in Curiosity, Mathematics, PAT reading comprehension, and Logical Problem-Solving, irrespective of the level of family income. ECE starting age mattered more than family income for Curiosity and Logical Problem-Solving.

After taking maternal education into account, the age at which children started ECE continued to show associations which were stronger than maternal education for Communication and Curiosity. However, the associations with Mathematics and PAT reading comprehension test were no longer significant. For reading age and Logical Problem-Solving, maternal education showed stronger associations than the age of starting ECE.

Length of ECE Experience

Children who started ECE at the same age did not all have the same length of ECE experience. Some children had no breaks in their ECE experience; others had intervals of no ECE. As at age 5 and age 6 (using the original children in the study), at age 8 (using all the children in the study), we again found that children's competencies showed more associations with the length of their ECE experience than with their ECE starting age.

Table 58

Length of ECE Experience and Children's Competency Scores at age 5, 6, and 8

Competency	Age 5	Age 6	Age 8
Mathematics	+	+	+*
Motor Skills#	+	+*	+
Logical Problem-Solving		+	+*
Communication		+*	+
Individual Responsibility	+		
Literacy		+	
Curiosity			+

#At age 6 and 8, only Fine Motor Skills were assessed.
* indicates the strongest association.

At age 8, children with more than 3 years of ECE experience scored higher than those with less for Communication and Curiosity. Children with more than 4 years ECE experience did best on Mathematics and Logical Problem-Solving. Children with less than 2 years ECE experience scored less than others on Fine Motor Skills. Overall, children with more than 4 years of ECE experience scored on average 6–7 points more, and those with more than 3 years scored on average 3–4 percentage points more, than those with a shorter length of ECE experience.

After taking family income at age 8 into account, we found that children's length of ECE experience continued to make its own positive contribution to Mathematics, Fine Motor Skills, Communication, and, though somewhat diluted, to Logical Problem-Solving. Children from the lowest income group seemed to benefit particularly from ECE experience of more than 2 years for Communication, and more than 4 years for Literacy: at age 8 low income children with this length of experience had closed the gap with high income children.

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[57] In all the two-factor analyses reported in chapters 7-12, we have fitted (put) one factor first, then reversed the order, putting the second factor first, to ensure that the analysis is not biased towards the factor which was fitted first.

After taking mother's education into account, we found that children's length of ECE experience continued to make its own contribution to children's Mathematics and Logical Problem-Solving scores. Children whose mother's qualification was at the mid or senior school level benefited particularly if they had had more than 48 months ECE. We could not distinguish between the contribution of ECE experience and mother's education to Communication. Children's length of ECE experience was less important than maternal qualification for their scores on Curiosity and Fine Motor Skills.

Patterns of ECE Experience[58]

The rest of the analyses of the associations between children's ECE experience and their competencies were done with the original sample children only, for whom we had data on their ECE experience near age-five, and competency levels at age 6.

We found that while 38 percent of the original study children attended only one ECE, 30 percent went to two or more, one after the other, and 32 percent had gone to two or more at the same time for at least part of their ECE experience. At age 5, these differences in patterns did not show any associations with children's competencies. At age 6, children who combined ECEs did better than others on Logical Problem-Solving, while children who attended only one ECE did best on Perseverance. These effects were weakened by taking family income into account. At age 8, children who had combined ECEs continued to score higher on Logical Problem-Solving, by 4 percentage points. However, taking family income into account removed this association. Thus there appear to be no disadvantages, or advantages, for any particular pattern of ECE attendance per se.

Final ECE Type

At age 5, children attending A'oga Amata (Samoan immersion ECE) tended to score lower than others on the competency measures. These differences were no longer evident when we took into account whether or not a child had English as their second language. There was no sign of this difference at age 6, but at age 8 it had emerged again, and was particularly noticeable for Mathematics, PAT reading, and Logical Problem-Solving.

The association at age 6 showing children who had attended playcentres scoring higher on Perseverance was no longer visible at age 8. However, children who had attended playcentres or childcare centres scored on average 8 percentage points more across the competencies than those who had attended A'oga Amata. This could well be explained by differences of family income and maternal education favouring children attending playcentre and childcare.

ECE Quality Ratings

We rated the quality of the children's final ECE centre in 4 areas: staff:child interaction; programme/activity focus; self-esteem; and physical environment, resources, and safety. At age 5 we found positive associations between the children's competency levels and all the quality ratings but Self-esteem, particularly for Social Skills, Perseverance, and Communication. At age

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[58] The analysis includes all 521 children in the study.

6, we found that children who attended higher rating centres on the Staff:Child Interaction rating showed higher average competency scores than others. The analysis that follows uses the original study children only.

Staff:Child Interaction

Table 59

Final ECE Centre Staff:Child Interaction Quality Rating and Children's Competency Scores at Age 5, 6 and 8

Competency	age 5	age 6	age 8
Literacy	+	+	+*
Social Skills with Peers	+*		+
Individual Responsibility		+	
Perseverance		+	
Mathematics			+

* strongest association

Children who attended ECE centres scoring above the median on the rating for staff:child interaction scored higher on Mathematics by 8–10 percentage points. Children who had attended ECE centres scoring in the top quartile of this rating scored better on the Literacy measures and on Social Skills with Peers, and they had a higher average overall score of 3.5 percentage points.

The staff:child interaction quality rating score remained associated with Mathematics and Literacy after taking family income into account, but the association with Social Skills with Peers did not. Taking mother's education into account saw the association with Social Skills with Peers remain, as did the association with Literacy, albeit diluted. The association with Mathematics did not remain.

Self-esteem

At age 8, there were associations with 2 of the items in the rating for self-esteem.

At age 6, we found that children whose final ECE service scored in the top quartile for the item *Children allowed to complete activities* were ahead of others on the Perseverance measure by 6 to 8 percentage points. At age 8, they continued to score higher for Perseverance, by 8 to 11 percentage points. The association was stronger at age 8 than at age 6. Overall, children who had attended centres scoring more highly for this item did better than others by 3–4 percentage points on average. This remained the case after taking family income and mother's education into account.

At age 8, we found that children whose final ECE centre scored above the median for the item *Activities are not sex-stereotyped* had higher scores on two of the Literacy measures. They scored 5.5 percentage points more on the writing and PAT reading comprehension measures than other children.

There was a tendency for children whose final ECE service scored in the top quartile on the item of *Tikanga Māori is evident* to show slightly higher scores than others, but this was not statistically significant.

Programme/Activity

As at age 6, there were no associations found at age 8 for this rating, though at age 5 children in high rating centres had been ahead of others on Perseverance, Communication, and Social Skills with Peers.

Resources and Safety

As at age 6, there were no associations found at age 8 for this rating, though at age 5 children in high rating centres had been ahead of others on Perseverance, Communication, Social Skills with Peers, and Social Skills with Adults.

ECE Quality Ratings by Item

We decided to look at individual items within each of our quality ratings. This showed that most of the positive associations with the staff:child interaction rating came from 4 items:

- staff are responsive to children *(positive for children attending top quartile centres)*
- staff model/guide children within the context of centre activities *(positive for children attending top quartile centres)*
- staff ask children open-ended questions that encourage children to choose their own answer *(negative for children attending low scoring centres)*
- staff join children in their play. *(positive for children attending top quartile centres)*

The only item in this rating which showed no associations was "staff model—and encourage children to use—redirection, positive reinforcement, explanation and encouragement as guidance/ discipline techniques."

We also found associations between children's competencies at age 8 and the following individual items from the other quality ratings:

- children can select their own activities from a variety of learning areas *(positive for Individual Responsibility, Social Skills with Peers, Social Skills with Adults, and Communication for children attending top quartile centres)*
- the centre is a "print-saturated environment" *(negative for Perseverance, Social Skills with Peers, Social Skills with Adults, Mathematics, PAT reading comprehension, Burt word recognition, Logical Problem-Solving for children attending bottom quartile centres)*
- there are enough age appropriate toys/books/equipment to avoid problems of waiting, competing, and fighting for scarce resources *(positive for Social Skills with Peers for children attending top quartile centres).*

We then looked at all the quality items in relation to an overall competency measure[59] to see which were the factors which were most likely to predict children's scores overall. This analysis[60] yielded these ECE quality factors as key:

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[59] This measure was the first principal component in our principal components analysis, see Figure 1, Appendix 1. This composite competency accounts for 45 percent of the variance in the competency scores. It gives approximately equal weighting to Perseverance, Individual Responsibility, Communication, Mathematics, and the 3 reading measures which were part of the Literacy competency, with slightly less of the writing score, somewhat less of the social skills and Logical Problem-Solving competencies, and much less of the Curiosity and Fine Motor Skills competencies.

- ✧ staff model/ guide children in centre activities
- ✧ the centre is a "print-saturated" environment
- ✧ stories are told
- ✧ staff model and encourage redirection, positive reinforcement

The first two of these four quality items had emerged in our one-factor analysis of the associations between ece quality items and particular competencies, but the items "stories are told" and "staff model and encourage redirection, positive reinforcement" were only visible when we looked at the associations with children's competency levels.

Each of these quality items seems to make its own contribution to children's overall competency levels. The contribution of the "stories are told" factor is the weakest, and indeed ceases to have any additional association with the overall competency once the factor of "print-saturated environment" is fitted first.[61] This suggests that what is done with the printed material is important. When stories were often told, it was helpful to have a choice of printed material; when stories were rare, having much written material around the ECE centre did not advantage children.

A further analysis[62] showed that two other items also had an association with the overall competency that made a contribution in addition to that accounted for by the other ECE quality items. These were:

- ✧ staff are responsive to children
- ✧ there are enough age appropriate toys/books/equipment to avoid problems of waiting, competing, and fighting for scarce resources.

Together these different approaches to analysing the role of quality in early childhood education in children's competencies can show us which particular aspects of quality can make a difference to children's competency levels, even after the children had finished their early childhood education three years before.

Parental Satisfaction and Involvement

At age 5 we found no association between children's competency scores and parental satisfaction with their child's final ECE service, or the level of their involvement with that service. We checked these again at age 8, for the original study children. We continued to find no associations with parental involvement or opportunity to talk to ECE staff about their child, but did find that children whose parents thought there had been some negative aspect to their child's final ECE experience did better on Logical Problem-Solving, by 4 percentage points ($p = .04$).

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[60] Using stepwise regression.

[61] The correlation between these two factors was r=0.56.

[62] Using non-stepwise regression.

ECE Socioeconomic Mix

Table 60

Final ECE Socioeconomic Mix and Children's Competency Scores at age 5, 6, and 8

Competency	Age 5	Age 6	Age 8
Mathematics	+	+	+*
Motor Skills	+		
Logical Problem-Solving	+	+	+*
Communication	+	+*	
Social Skills with Adults		+	
Social Skills with Peers	+		+
Literacy	+*	+	+

* strongest associations

At age 5, it was the children whose final ECE centre served mainly low income children who scored lower than others. At ages 6 and 8, it was the children whose final ECE centre served a mainly middle-class group who scored higher than others.

ECE socioeconomic mix and family income overlapped in relation to the Literacy measures and Social Skills with Peers. The ECE socioeconomic mix association with Mathematics remained after taking family income at age 8 into account, and showed stronger associations than family income. It also remained for Logical Problem-Solving, with much the same strength as family income at age 8. ECE socioeconomic mix was slightly stronger than family income at age 8 in relation to the Cognitive Composite Competency, which was the average of the sum of scores for Mathematics, Logical Problem-Solving, Literacy (reading), and Literacy (writing). The contributions of family income at age 8 and ECE socioeconomic mix were indistinguishable in relation to the Composite Competency, which was the average of the sum of all the competencies.

Summary

Early childhood education experiences remained evident in the children's competency levels 3 years after they had left ECE to go on to school. Communication, Mathematics, Perseverance, and Social Skills with Peers have shown associations with children's early childhood education experience at each phase. Literacy and Logical Problem-Solving showed associations at age 6, and these continue at age 8. The associations with Motor Skills have vanished at age 8, but a new association with Curiosity has emerged.

Table 61

ECE Experiences and Children's Competency Levels at Age 8

Competency	ECE Factor showing associations at age 8
Communication(5)(6)	Starting age(5)(6), length(5)(6), children can select activities(5)
Mathematics (5)(6)	Length(5)(6), staff-child interaction quality, print-saturated environment, SES mix (5)(6)
Literacy(5)(6)	Starting age, staff-child interaction quality(5)(6), non sex-stereotyped activities, SES mix (5)(6)
Logical Problem-Solving(6)	Starting age(6), length(6), print-saturated environment, SES mix (5)(6)
Perseverance(5)(6)	Children allowed to complete activities(6), print-saturated environment
Individual Responsibility(6)	Children can select activities
Social Skills with Peers(5)	Staff-child interaction(6), children can select activities(5), print saturated environment, adequate resources, SES mix
Social Skills with Adults(6)	Print-saturated environment
Curiosity	Starting age, length

(5) = associations also found at age 5
(6) = associations also found at age 6

Quality in ECE did make a difference for children's competencies at age 8. Some aspects have an association with particular competencies. Others are more evident when looking at children's overall competency levels.

We found no associations between children's competency levels and their last ECE centre's rating for two aspects of quality, child initiated dramatic play, or for children's working on problem-solving. This may indicate that it is individual children's own involvement in these particular activities which matters rather than opportunity alone.

The differences in children's scores attributable to differences in their ECE experience ranged from 4 to 17 percentage points, with most between 6–8 percentage points. ECE experience made its strongest impact on Mathematics and the PAT reading comprehension test measure. Early childhood education factors made modest contributions to Communication, Social Skills with Peers, and Curiosity, and moderate contributions to Perseverance, Social Skills with Adults, and Logical Problem-Solving.[63]

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[63] The proportion of variance in children's scores explained by ECE factors in one-factor modelling ranged from 2.7 to 6.7, mostly in the range of 3–5 percent.

CHAPTER 8

SCHOOL RESOURCES AND CHILDREN'S COMPETENCIES

The school-related factors we look at in this chapter encompass resources, structures, and experiences. We also include teachers' and parents' perceptions of the children's overall progress. The analyses are done for all children at age 8. The factors we look at are:

The School
School socioeconomic composition
School decile
School type—ownership
School funding per student

The Class
Class experience of multiple choice tests
Class level
Class size
Children's view of their classes
Composite and single-level classes
Open plan and single cell classrooms
Proportion of children in the class with English as a second language
Class turnover
Teachers' teaching experience
Teachers' qualifications and current professional development

Child's and Parents' Relation to the School
School attendance
Mobility between schools
Parental involvement in school
Parental help with homework
Parental ease in talking to child's teacher
Parental views of their child's school progress
Parental educational aspirations for their child

Teacher Perception of Child's Progress
Teacher rating of children's school progress

School Socioeconomic Composition and School Decile

We had two ways of measuring the socioeconomic composition of a school's students. We asked teachers to categorize this in 4 broad categories; and we also used school socioeconomic decile ratings assigned by the Ministry of Education.

Differerences among the socioeconomic status of the students served by a school have been found to explain most of the variation among schools in student achievement (e.g. Gibson and Asthana 1998). Hierarchical linear modelling which takes prior student achievement and individual family socioeconomic status into account raises questions about the impact of the socioeconomic composition of a school's students as a whole (the "school mix") on individual student achievement, in addition to these factors. Some studies find that there is no additional impact of school socioeconomic mix after taking prior student achievement and individual family socioeconomic status into account,(e.g. Nash and Harker 1998); others find that the particular socioeconomic mix of students in schools does have an additional impact on achievement (Caldas and Bankston 1997, Lauder and Hughes 1998, literature reviewed in Wylie 1998).

Most of the hierarchical linear modelling of the impact of school socioeconomic mix uses standardised tests at the start of secondary school to assess prior achievement. Scores on these measures of prior achievement may in fact reflect student learning at different primary schools, and the characteristics of these different primary schools. The Competent Children data allows some exploration of the relation of school social composition to students' competency levels in primary school, and of any additional impact which may come over and above the school social composition.

The approach we take here is, as with other factors, one factor analysis of variance.We are unable to carry out hierarchical linear modelling, since we have only a few children at most from each school.[64]

At age 6, we found differences favouring children attending schools serving middle-class children (using teachers' rating of the socioeconomic mix of the community served by their school), and schools that were not decile 1-2 schools (using the Ministry of Education's decile ratings). These differences were for Mathematics, Communication, and Literacy.

School Socioeconomic Composition (school "mix")

Using teacher ratings, we found a wider range of associations at age 8 between children's competencies and the school socioeconomic composition. All the highest scores came from children attending schools categorized by their teachers as serving mainly middle class families, or serving a wide social mix. This is somewhat different from age 6, where it was only attending mainly middle income schools which was associated with higher scores. Also intriguingly, at age 8 the lowest scores were generally for children attending low-middle income schools, not those children attending schools serving mainly low income families.[65] The next table shows these differences.

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[64] The need to have at least 20 children from each school, with individual and school level socioeconomic data and prior achievement levels, makes HLM analyses difficult and expensive to carry out in the absence of robust national data-bases such as the National Educational Longitudinal Study in the USA. New Zealand studies using HLM have had to use small school samples. This makes it difficult to be sure that the patterns found are representative of all schools.

[65] This may reflect differences in teachers' categorizations, since the patterns we found for school deciles are consistent between the years.

Table 62

School Socioeconomic Composition and Children's Competencies at Age 8

School Socioeconomic Mix[66] → Competency ↓	Wide social mix n=89	Middle n=284	Low to middle n=62	Low n=81	Probability
Individual Responsibility	**68.7**	68.5	*59.8*	66.0	0.014
Social Skills with Peers	66.6	**67.2**	*62.4*	64.8	0.019
Social Skills with Adults	**75.5**	73.4	*65.9*	72.9	0.009
Communication	**72.3**	70.8	*61.6*	69.1	0.0004
Mathematics	65.1	**67.5**	*46.0*	57.1	0.00000000003
Fine Motor Skills	**86.3**	84.6	82.8	*81.1*	0.021
PAT reading score	**43.6**	42.8	*24.8*	33.6	0.000000002
Burt word reading test	49.7	**49.5**	*36.4*	44.4	0.00000007
Writing score	**62.4**	62.2	*55.5*	56.7	0.003
Teacher perception of reading age	9½-10yrs	**9½-10yrs**	*8-8½yrs*	9-9½yrs	0.0000000003
Logical Problem Solving	48.7	**48.9**	*37.9*	42.5	0.0000002
Composite Competency[67]	**65.7**	65.5	*57.1*	61.1	0.0000003
Composite Cognitive Competency[68]	55.7	**56.2**	*42.7*	48.8	0.00000000002

The highest scores for each competency are in **bold** type, the lowest in *italics*.

The size of the gaps is quite marked, particularly for Mathematics, PAT reading comprehension, and the Burt word reading test.

On the Composite Competency, children attending schools serving largely low-middle income groups were behind their peers in schools serving mainly middle class children, or a wide social mix by 8 percentage points, and behind their peers attending schools serving mainly low income children by 4 percentage points. Children from schools serving mainly low income families were behind their peers in schools serving mainly middle class children or a wide social mix by 4 percentage points.

On the Composite Cognitive Competency, children from schools serving mainly low-middle income families were behind their peers in schools serving mainly middle-class students or a wide social mix by 13 percentage points, and behind their peers in schools serving mainly low income students by 6 percentage points. Children from schools serving mainly low income students were behind their peers in schools serving mainly middle-class students or a wide social mix by 7 percentage points.

We did not include family income into a two-factor model, because we did so with the very similar factor of school decile, which we turn to next.

School Decile (State and Integrated Schools Only)

At age 6, it was the children attending schools in the two lowest deciles whose scores were lower than others, for 3 of the competency measures: Communication, Mathematics, and the Literacy measure of Invented Spelling. At age 8, this pattern continued, and widened. Children attending decile 1-2 schools also scored less than others on Logical Problem-Solving and less than children in decile 9–10 schools on Social Skills with Peers. Children attending decile 3–4 and 5–6 schools scored less than their peers in decile 9–10 schools. Children attending decile 7–8 schools scored less than children in decile 9–10 schools on Mathematics and Logical Problem-Solving.

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[66] As estimated by teachers.

[67] This is the average of the sum of all the competencies, splitting Literacy into reading and writing. The score for Literacy (reading) is derived from giving equal weight to PAT reading comprehension and Burt Word reading scores to give one score. We did not use teachers' estimates of reading age in the composite competency.

[68] This is the average of the sum of scores for Mathematics, Logical Problem-Solving, Literacy (reading), and Literacy (writing).

Table 63

School Decile and Children's Competencies at Age 8

Decile → **Competency ↓**	**Decile 1–2 n = 47**	**Decile 3–4 n = 67**	**Decile 5–6 n = 43**	**Decile 7–8 n = 65**	**Decile 9–10 n = 273**	**Probability**
Social Skills with Peers	63.4	63.8	64.5	65.9	**67.8**	0.017
Communication	64.6	66.7	67.0	**72.2**	71.0	0.016
Mathematics	46.1	59.6	59.2	60.9	**67.1**	0.0000007
PAT reading score	23.9	34.9	37.2	40.9	**42.0**	0.000006
Burt word reading test	38.8	44.0	43.7	46.1	**49.5**	0.0003
Writing score	57.1	59.5	55.9	57.9	**62.2**	0.048
Teacher perception of reading age	8½ -8yrs	9-9½yrs	9-9½yrs	**9½-10yrs**	9-9½yrs	0.00004
Logical Problem-Solving	38.2	44.4	45.5	44.3	**48.5**	0.0004
Composite Competency	58.2	62.2	61.4	63.5	**65.4**	0.0008

The highest scores for each competency are in **bold** type, the lowest in *italics.*

After taking individual family income into account, the associations between school decile and children's scores for Social Skills with Peers and Communication were no longer evident. School decile continued to have some additional impact over and above individual family income for the other competencies. School decile and family income had the same impact on Mathematics scores. School decile had a stronger association than family income with respect to Logical Problem-Solving. Family income's association with the Literacy measures was a little stronger than school decile.

There were some indicative trends of particular interest with regard to the question of whether school socioeconomic composition has an effect over and above family income. Within the group of children from the lowest income families, scores on the PAT reading comprehension test were 18 percentage points for those (n = 9) attending decile 1–2 schools, but 28–31 percentage points for those (n = 29) attending decile 3–8 schools, and 35 percentage points for those (n = 21) attending decile 9–10 schools. High income children's PAT readding scores remained at much the same level, whatever the decile of their school, and remained 10 percentage points above the scores of other children in decile 9–10 schools. For Mathematics, we found a similar pattern, but low income children attending decile 9–10 schools scored much the same as high income children in decile 9–10 schools. Thus school decile seems to have more impact for children from low income homes than it does for other children.

Finally, because of the interest in whether school socioeconomic mix has an impact over and above family income, or, as it is operationalised in some school effectiveness research, an additional impact over and above the pooled data on family income for all the school's students, we fitted the children's age 5 score and their school decile into a two-factor analysis of variance model. School decile had a stronger influence on the children's PAT reading scores at age 8 than did their age 5 literacy scores. When we fitted family income at age 5, the child's Literacy score at age 5, and school decile, we accounted for 25 percent of the variance or spread of scores among children. Family income played a stronger part, but school decile did play a small additional part, differentiating children from decile 1–2 schools and those from decile 6–10 schools. There was also an indicative trend showing the same pattern for Logical Problem-Solving.

School Ownership

At age 6, we found that children attending private schools scored higher on average on 1 competency measure, the Burt word reading test. It was not possible to tell whether this association in fact reflected school type or family income. At age 8, we found no difference in scores on the Burt word reading test, but higher scores for private school students on the PAT reading test,[69] Logical Problem-Solving, and the Composite Cognitive Competency.

Table 64

School Ownership and Children's Competencies at Age 8

School Ownership → **Competency ↓**	**State** n=415	**State Integrated** n=80	**Private Fully Reg.** n=28	**Probability**
PAT Reading score	38.4	40.8	**51.9**	0.007
Logical Problem-Solving	46.1	46.4	**54.2**	0.029
Composite Cognitive Competency	52.9	53.4	**60.6**	0.032

The highest scores for each competency are in **bold** type, the lowest in *italics*.

When we analysed the associations with school type after taking into account (in separate two-factor analyses) school socioeconomic composition (teacher-rated)[70], family income, mother's qualification, and class experience with multiple choice tests, the associations with school type either became weak or vanished. School socioeconomic status, family income, and mother's qualification far outweighed school type.This is consistent with other research on the relation between school type, in terms of ownership, and student achievement (Wylie 1998).

School Funding Per Student

The relation between school resourcing and children's achievements is difficult to research. The research is either inconclusive, or suggestive of a positive relationship between increased funding and children's outcomes (Burtless 1996). It is difficult to get an accurate amount of funding per child, given that school income may not reflect actual spending at the time (money may be put aside for capital expenditure, for example, and more local income than usual may be raised to fund capital projects), and/or may not translate into an equal amount available or spent per classroom or per student. It is also a moot point as to whether current resources can be seen to have an immediate bearing on children's performance. The data from this project on computer ownership, public library use, and past family income, for example, suggest that prior levels of resourcing are sometimes more important than current levels.

We found no relationship between levels of state and integrated school funding per child,[71] and children's competencies. There was no change to this after we took school decile, school socioeconomic mix, and school size into account in separate two-factor analyses.

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[69] The last IEA study of reading found an advantage for private school students of 9 percentage points for the total of the 4 measures of reading used. This advantage was diluted after taking parental education into account. (Wagemaker 1993, p. 46.)

[70] Decile ratings were not available for private schools.

[71] To estimate this, we combined data kindly supplied by the Ministry of Education for each state and integrated school's operational funds, teacher salaries, and net local funds raised by the school, and divided by the school roll used for funding purposes. Comparable data for private schools was not held by the Ministry of Education.

Class Experience with Multiple Choice Tests

Our project advisory group warned that children's marks on the multiple choice tests that we used for the first time at age 8 could reflect their experience with these tests. Twenty-six percent of the children came from classes which did not use multiple choice tests. These children did show lower scores on the 2 multiple choice tests - Mathematics and PAT reading, but they also showed lower scores for the teacher-rated measures of Perseverance, Social Skills with Peers, and the teacher perception of child's reading age.

Table 65

Class Experience with Multiple Choice Tests and Children's Competencies at Age 8

Class does Multiple Choice tests→ Competency↓	**Does multiple choice tests n = 389**	**Does not do multiple choice tests n = 134**	**Probability**
Perseverance	**67.3**	*62.7*	0.030
Social Skills with Peers	**67.1**	*63.9*	0.0087
Mathematics	**65.2**	*56.7*	0.00024
PAT reading score	**41.1**	*35.1*	0.0067
Burt word reading test	**48.0**	*44.5*	0.033
Teacher perception of reading age	**9½-10yrs**	*9-9½ yrs*	0.0078
Logical Problem-Solving	**47.8**	*43.2*	0.0032
Composite Competency	**64.9**	*61.4*	0.0027
Composite Cognitive Competency	**54.7**	*49.6*	0.00057

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Only 36 percent of the children in decile 1-2 schools had experience with multiple choice tests, compared with 58 percent of children in decile 3-4 schools, and 81 percent in decile 5-10 schools. When we took school decile into account, *none* of the associations with experience with multiple choice tests remained. School decile was by far the stronger factor associated with children's scores.

Class Level

Children usually enter New Zealand schools on their fifth birthday. Because classes other than new entrants are usually formed at the start of a school year, children the same age can find themselves in different level classes. Just over half the study children were in Year 4 classes when they were assessed. It was thought that children who were in different year levels would perform differently on the PAT tests particularly, since they would not have covered the same curriculum. In the event, this made no difference for the reduced version of PAT Mathematics.[72] The next table shows the differences between children in Years 3 and 4 at the time the children did the Mathematics test. These are for the Literacy measures and Logical Problem-Solving.

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[72] The TIMSS study (Third International Mathematics and Science Study) did find that standard 3 children (year 5) mean Mathematics scores were 12 percent less than standard 4 children (year 6). (Chamberlain 1997, p. 67)

Table 66

Class Level and Children's Competencies at Age 8

Class Level → Competency ↓	Year 3 n = 228	Year 4 n = 293	Probability
Mathematics	*62*	**64**	n.s.
PAT reading score	*36.9*	**41.6**	0.016
Burt word reading test	*44.1*	**49.5**	0.00020
Writing score	*57.7*	**62.9**	0.00047
Teacher perception of reading age	*9-9½yrs*	**9½-10**	0.029
Composite Competency	*62.6*	**65.1**	0.018
Composite Cognitive Competency	*51.5*	**55.0**	0.0064

The highest scores for each competency are in **bold** type, the lowest in *italics*.
n.s. = not significant

Class Size

Class sizes experienced by the children in the study ranged from 13 to 40, with the median at 28. This compares with slightly smaller classes when the children were aged 6, when the range was 7 to 38, and the median was 26. At age 6, we found that children who were in classes of 21 or fewer scored higher than others on Curiosity and Social Skills with Peers. At age 8, we found a tendency for children in classes over 30 to score lower than others on Perseverance and Individual Responsibility. Children in classes of 28–30 did as well as children in smaller classes.

Given that there is increasing evidence that class size does matter, we were surprised not to find more associations here. However, some of our children were interviewed close to the start of the school year, and one could expect that class size (and other resource related factors) might not impinge with such a short length of experience.

Children's View of their Classes

The *My Class Inventory* we used to give us some picture of children's classrooms has 5 sub-scales. We classified the scores into 3 levels. Generally, only the highest or lowest level stood out. We found that children who had low scores on the *Satisfaction* sub-scale also had lower scores than children who had medium or high scores for Social Skills with Peers (6 and 7 percentage points), and Social Skills with Adults (9 and 8 percentage points).

Children who rated their classroom low on the *Friction* sub-scale had higher scores on a number of the competency measures.

Table 67

Child's Rating of Friction in Class and Children's Competencies at Age 8

Child's rating of Class—Friction → Competency ↓	low score 5 or 7 n = 160	medium score 9 or 11 n = 217	high score 13 or 15 n = 145	Probability
Social Skills with Peers	**68.5**	66.1	*64.1*	0.0038
Mathematics	**66.1**	63.4	*59.0*	0.026
Fine Motor Skills	**85.4**	84.4	*82.2*	0.035
PAT reading score	**42.3**	40.1	*35.6*	0.028
Teacher perception of reading age	**9½-10yrs**	9½-10yrs	*9-9½yrs*	0.031
Logical Problem-Solving	**49.6**	47.4	*42.1*	0.000083
Composite Competency	**65.7**	64.3	*61.6*	0.0085
Composite Cognitive Competency	**56.1**	53.7	*50.0*	0.0013

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Children who gave a medium rating to the *Competitive* level in their class generally had the lowest scores, and those who judged the competition in their class to be low had the highest scores, on a number of competencies.[73]

Table 68

Child's Rating of Competition in Class and Children's Competencies at Age 8

Child's rating of Class Competitiveness → Competency ↓	**low score 5 or 7 n=90**	**medium score 9 or 11 n=183**	**high score 13 or 15 n=249**	**Probability**
Perseverance	**69.2**	*63.1*	67.4	0.042
Social Skills with Peers	**69.3**	*65.5*	65.8	0.037
PAT reading score	**45.0**	*37.7*	38.9	0.029
Teacher perception of reading age	**9½-10yrs**	*9-9½ yrs*	9-9½yrs	0.039
Composite Competency	**66.5**	*62.6*	64.0	0.032
Composite Cognitive Competency	**56.7**	*52.4*	53.0	0.063

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Children who rated their class low on the *Cohesiveness* subscale did better than others for most of the cognitive competencies. This subscale focuses on student friendliness towards each other.

Table 69

Child's Rating of Class Cohesiveness and Children's Competencies at Age 8

Child's rating of ClassCohesiveness → Competency ↓	**low score 5 or 7 n=158**	**medium score 9 or 11 n=193**	**high score 13 or 15 n=171**	**Probability**
Mathematics	**67.8**	65.3	*56.0*	0.0000040
Fine Motor Skills	**85.8**	84.4	*82.2*	0.026
PAT reading score	**45.3**	39.6	*34.0*	0.000022
Burt word reading test	50.2	47.3	*44.1*	0.0034
Teacher perception of reading age	9½-10yrs	9½-10yrs	9-9½yrs	0.0036
Logical Problem-Solving	50.4	47.6	*42.0*	0.0000024
Composite Competency	**66.0**	64.0	*62.0*	0.0066
Composite Cognitive Competency	57.0	54.1	*49.2*	0.0000075

The highest scores for each competency are in **bold** type, the lowest in *italics*.

The sub-scale which showed the most associations with children's competency levels was *Difficulty*. Children who rated their class low on the level of difficulty they found in the work they did in their classsrooms did better than others all round on our competency measures. This may indicate that the work they were getting from their teachers was pitched at the right level to provide children with confidence in learning, and/or that these children were good overall performers.

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[73] Fisher, Fraser, and Bassett (1995) cite one American study using the *My Class Inventory* which found that greater classroom competitiveness was associated with lower reading scores. Other studies cited by them found relations between all of this instrument's sub-scales and children's achievement, though one Australian study found associations for all the sub-scales except Competition.

Table 70

Child's Rating of Difficulty of work in their class and Children's Competencies at Age 8

Child's rating of Difficulty of work in class → Competency ↓	**low score 5 or 7 n = 273**	**medium score 9 or 11 n = 228**	**high score 13 or 15 n = 21**	**Probability**
Curiosity	**64.9**	*61.0*	62.5	0.037
Perseverance	**68.8**	*63.4*	64.0	0.017
Individual Responsibility	**69.5**	*64.8*	65.2	0.029
Social Skills with Peers	**68.1**	64.7	*60.6*	**0.00064**
Social skills with Adults	**76.5**	*69.1*	69.9	**0.0000027**
Communication	**73.1**	*66.1*	70.1	**0.000021**
Mathematics	**68.1**	58.1	*50.2*	**0.00000025**
Fine Motor Skills	**84.7**	84.1	*77.2*	0.029
PAT reading score	**43.3**	35.9	*29.3*	**0.000095**
Burt word reading test	**49.9**	44.2	*42.1*	**0.00021**
Writing score	**62.8**	*58.1*	*58.1*	**0.0061**
Teacher perception of reading age	**9½-10yrs**	*9-9½yrs*	*9-9½yrs*	**0.000017**
Logical Problem-Solving	**49.0**	44.1	*43.2*	**0.0010**
Composite Competency	**66.5**	61.2	*59.7*	**0.00000048**
Composite Cognitive Competency	**56.6**	50.2	*46.8*	**0.00000071**

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Composite and Single-level Classes

Sixty-nine percent of the children were in composite classes. They showed lower scores for four measures than children in single-level classes. This includes the PAT reading comprehension test, which contrasts with the finding of no difference for New Zealand 9 and 14 year old students in composite and single level classes on 3 measures of reading achievement in the 1990 IEA reading study (Chamberlain 1993, p. 96). This difference in findings may reflect differences in the measures used.

Table 71

Composite and Single-level Classes and Children's Competencies at Age 8

Class form → Competency ↓	**Composite class n = 357**	**Single-level class n = 166**	**Probability**
Social Skills with Adults	*72.0*	**75.1**	0.044
Communication	*68.5*	**72.8**	**0.0061**
PAT reading score	*37.8*	**43.2**	**0.0089**
Writing score	*59.5*	**62.8**	0.041
Composite Competency	*63.2*	**65.5**	0.033
Composite Cognitive Competency	*52.4*	**55.6**	0.023

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Children in decile 5–6 and decile 9–10 schools were most likely to be in single-level classrooms (33 and 40 percent respectively). When we took school decile into account, we found that while the single-level classroom's association with Communication remained, albeit diluted, the associations with the PAT reading test, writing, and the Composite Cognitive Competency went. There were two interactive effects for Mathematics: children who were in composite classes in decile 9–10 schools scored 5 percentage points more on average, while children who were in single-level classes in decile 3–4 schools scored 16 percentage points more.

When we took school type into account, we found that the associations with the nature of the class went, but some interesting interactions emerged. Children attending state schools who were in single-level classes did better for Communication, Burt word reading, and reading age; and on the Composite Competency, they scored 4 percentage points more than others. The opposite was found for children in integrated schools, with a higher score of 5 percentage points for the Composite Competency for children in composite classes.

However, these differences may be due to the year levels of our sample in different types of school, and different decile ratings. We shall test this out in our analysis of the data currently being gathered as the study children turn 10 years old.

Open Plan and Single Classrooms

Ninety percent of the children were in single classrooms, that is, they did not share the classroom space with another class. The only advantage found for children in single classrooms was that they were 5 percentage points ahead on Social Skills with Adults (p = 0.03).

Proportion of Children in the Class with English as a Second Language (ESL)

Forty-five percent of the children were in classes where all had English as their first language. A quarter of the children's classes had 10.3 percent or more ESL enrolment, and 8 percent of their classes had more than 33 percent ESL enrolment.

At age 6 we found that children in classes with more than 11 percent ESL enrolment scored slightly lower on Communication. At age 8, that gap remains, and others are now visible.

Table 72

Proportion of ESL Children in Child's Class and Children's Competencies at Age 8

Percent ESL in Class → **Competency ↓**	**Percent ESL < 11%** n = 403	**Percent ESL > 11%** n = 120	**Probability**
Individual Responsibility	**68.1**	*64.1*	0.051
Social skills with Adults	**73.8**	*70.3*	0.041
Communication	**70.8**	*66.8*	0.034
Mathematics	**64.6**	*57.5*	0.0031
Teacher perception of reading age	**9½-10yrs**	*9-9½yrs*	0.0042
Logical Problem-Solving	**47.5**	*43.7*	0.019
Composite Competency	**64.6**	*61.9*	0.028

The highest scores for each competency are in **bold** type, the lowest in *italics*.

The proportion of children whose English was a second language in each class overlapped substantially with school decile. Fifty-one percent of the children at decile 9–10 schools had no ESL classmates, dropping to 34 percent of children at decile 3–4 schools, and 9 percent of children at decile 1-2 schools. After taking school decile into account, none of the associations with the proportion of children whose English was a second language in a classroom remained.

Class Turnover

Eighty-seven percent of the children were in stable classes. Eleven percent had a turnover of up to 25 percent of the class, and 2 percent a higher turnover. The highest scores were all in the stable classes, and most of the lowest scores were among children in classes with more than a quarter turnover. But a difference emerged only for Mathematics, with children in the stable classes 14 percentage points ahead of those in classes with high turnover (p = 0.045).

Teachers' Teaching Experience

We asked the teachers of the study children to tell us how long they had been teaching. Twenty-four percent had been teaching 2 or fewer years, 29 percent between 2 and 9 years, 22 percent between 9 and 17 years, and 24 percent more than 17 years. The highest children's scores occurred with teachers who had more than 17 years' experience; children whose teachers were new had lower scores than others for the cognitive competencies. However, these associations should be treated with caution, since we did not include in the model the length of time the child had been in the teacher's class, and, more importantly, the teaching experience of the child's former teachers, which is likely to have an equal if not larger impact on children's current competency levels.

Table 73

Teachers' Years of Teaching and Children's Competencies at Age 8

Teachers' Years of Teaching→ Competency↓	**1st quartile ≤2 years n=126**	**2nd quartile >2 & ≤9yrs n=152**	**3rd quartile >9 & ≤17yrs n=114**	**4th quartile >17 years n=124**	**Probability**
Perseverance	*62.7*	66.0	65.1	**70.8**	0.023
Communication	*67.1*	70.8	68.5	**72.7**	0.026
Mathematics	*56.8*	64.8	64.3	**66.6**	**0.0037**
PAT reading score	*35.1*	40.6	38.8	**43.3**	0.030
Burt word reading test	*43.6*	48.1	47.4	**49.6**	0.029
Writing score	*55.5*	62.3	61.6	**63.2**	**0.00081**
Teacher perception of reading age	9-9½yrs	9½-10yrs	9-9½yrs	9½-10yrs	0.039
Logical Problem-Solving	*43.1*	47.4	**48.3**	47.7	0.030
Composite Competency	*60.7*	64.7	64.0	**66.3**	**0.0015**
Composite Cognitive Competency	*48.8*	54.7	54.3	**56.0**	**0.00056**

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Teachers' Qualifications and Current Professional Development

The same caveats about drawing conclusions from patterns found between current experience and current teacher characteristics and children's competency levels also apply when we look at teachers' additional qualifications and current professional development. Any conclusions about the difference these can make for children would have to be based on information about all of a child's previous teachers, as well as their current teachers.

All the teachers of the study children had the teaching diplomas required for registration. We found only one marginal difference related to whether they had additional qualifications, as 66 percent did: children whose teachers had no additional qualification scored on average 4 percentage points more on the PAT reading test. This is partly because the teachers with the longest experience had fewer additional qualifications than others.

We found only a few indicative associations between competency scores and teachers' current professional development (courses over the last 2 years, whether taken in their own time or as part of the school's professional development programme).

Children whose teachers' school-based professional development was curriculum-based scored 4 percentage points more for writing ($p = 0.01$); other professional development was associated with a positive difference of 3 percentage points for Curiosity ($p = 0.05$).

Those whose teachers' school professional development focused on teaching methods tended to show lower scores for Mathematics and Literacy.

Children whose teachers were taking a B.Ed course scored 6 percentage points more for Communication ($p = 0.04$), and for Social Skills with Adults ($p = 0.05$). Those whose teachers were taking other university degree courses scored 8 percentage points more for Curiosity ($p = 0.04$).

Those whose teachers were doing a postgraduate diploma of education scored 6 percentage points more for Communication (p = 0.05), and 7 percentage points more for Logical Problem-Solving (p = 0.04).

School Attendance

Most children's school attendance was good. It was satisfactory for 28 children (5 percent). Only 6 children had poor attendance. At age 6 we found that children with good attendance scored higher than others on Word Recognition, and had an average 6 percentage points advantage. At age 8, we found more differences related to children's attendance, particularly for those competencies based on teacher ratings. However, though there are clear trends in the data, the number of children with poor attendance was very small; a larger sample may show different patterns.

Table 74

School Attendance and Children's Competencies at Age 8

School Attendance→ Competency↓	good n = 489	satisfactory n = 28	poor n = 6	Probability
Curiosity	**63.5**	56.9	*55.2*	0.071
Perseverance	**67.0**	57.6	*39.6*	**0.00066**
Individual Responsibility	**67.7**	63.6	*45.0*	**0.012**
Social Skills with Peers	66.4	**67.4**	*49.5*	**0.0040**
Social Skills with Adults	**73.3**	70.3	*55.2*	0.056
Communication	70.4	63.5	*53.2*	**0.011**
Writing score	**61.0**	53.9	*55.2*	0.074
Teacher perception of reading age	**9½-10**	9-9½yrs	9-9½yrs	0.062
Composite Competency	**64.3**	60.2	*51.6*	**0.0068**

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Patterns of school attendance were similar for all income groups. After taking family income into account, all the associations between children's school attendance and competencies remained. Children whose mothers had no qualification were more likely to have only satisfactory or poor attendance (17 percent, compared with 7 percent overall). After allowing for mother's education, all the associations between children's school attendance and competencies also remained, with the exception of Social Skills with Adults. Children whose mothers had no qualifications benefited particularly from good attendance.

Mobility Between Schools

Eighty-one percent of the children had attended only one school between the ages of 5 and 8. Fifteen percent attended 2 schools, and 4 percent, 3 or more schools. Only one association was found: children who had been to only 1 school scored 5 percentage points more for Curiosity than those who had been to 2. This association remained when family income was taken into account.

Parental Involvement in School

Children of parents who had no involvement in their child's school scored less than others on Mathematics, most of the Literacy measures, Communication, Perseverance, and Fine Motor Skills.

Table 75

Parental Involvement in School and Children's Competencies at Age 8

Parental Involvement in School→ Competency↓	no involvement n=47	some involvement n=474	Probability
Perseverance	*58.5*	**67.0**	0.0092
Communication	*64.3*	**70.5**	0.022
Mathematics	*55.1*	**63.9**	0.013
Fine Motor Skills	*80.1*	**84.5**	0.021
PAT reading score	*30.8*	**40.5**	0.0045
Writing score	*55.5*	**61.1**	0.031
Teacher perception of reading age	*9-9½yrs*	**9½-10yrs**	0.038
Logical Problem-Solving	*43.7*	**46.9**	
Composite Competency	*59.7*	**64.4**	0.0076
Composite Cognitive Competency	*47.9*	**54.0**	0.0078

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Parents from the highest income families were most likely to have some involvement with their child's school (97 percent). After taking family income into account, the only association remaining between children's competencies and parental involvement in the school was with the PAT reading test. Children whose parents had some involvement with their child's school were about 10 percentage points ahead of those who did not.

Parental involvement in the child's school was lowest for mothers who had no school qualification (15 percent compared to 8 percent for others). After taking mother's qualification into account, the associations between involvement in the child's school remained for Perseverance, Communication, Mathematics, and the PAT reading test, but were no longer evident for writing and reading age.

The particular kind of parental involvement[74] which seemed to make a difference for children was voluntary work at or for the school, but not being a school trustee, or taking part in the Parent-Teacher Association. Talking regularly with the teacher also showed no advantages, though this may indicate that those who did so had some concerns about their child's progress.

The next table shows the associations between voluntary work at the school and children's competency levels.

Table 76

Parental Involvement through Voluntary Work at School and Children's Competencies at Age 8

Parental Involvement in School→ Competency↓	does voluntary work at school n=218	no voluntary work at school n=303	Probability
Perseverance	**68.7**	*64.5*	0.027
Individual Responsibility	**69.5**	*65.7*	0.028
Communication	**72.1**	*68.4*	0.0148
PAT reading score	**42.7**	*37.4*	0.0072
Burt word reading test	**48.9**	*45.9*	0.042
Teacher's Perception of reading age	**9½-10yrs**	*9-9½yrs*	0.018
Composite Competency	**65.3**	*63.1*	0.031
Composite Cognitive Competency	**55.0**	*52.4*	0.049

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Other parental voluntary work for the school, for example in working bees, also showed some advantages for children.

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[74] Our question here was open-ended.

Table 77

Parental Involvement through Voluntary Work for Child's School and Children's Competencies at Age 8

Parental Involvement in School→ Competency↓	does voluntary work for school n=151	no voluntary work for school n=370	Probability
Social skills with Adults	**76.1**	*71.8*	0.015
Communication	**73.0**	*68.7*	0.010
Mathematics	**67.1**	*61.5*	0.013
Composite Competency	**65.8**	*63.3*	0.024
Composite Cognitive Competency	**55.6**	*52.6*	0.040

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Children of parents who attended school meetings or functions were ahead on the PAT reading test by 7 percentage points, and on Fine Motor Skills by 4 percentage points.

Parental Help with Homework

Only 23 parents said they did not help their child with their homework, and only 7 said their children had no homework. There were no differences between their children's scores and others.

When we looked in more detail at the kinds of help parents give their children, some interesting patterns emerged. Children whose parents helped them with reading had lower scores for Literacy, Mathematics, Communication, Logical Problem-Solving, Perseverance, and Fine Motor Skills. Those whose parents helped them with mathematics scored 5 percentage points less on our Mathematics measure than did others (p=0.02). This would indicate that parents are helping those who need help (this is consistent with the fact that most of the children who have academic lessons outside school were low or average achievers overall). But help with spelling and writing appears to go across the board; no associations were found here.

What seemed helpful for all children was providing resources, supervising homework, and helping with projects or research. Children who had help with their projects had higher scores for the Burt word reading test of 5 percentage points (p=0.007), and their reading age was 8 months ahead of others. Children whose homework was supervised scored 6 percentage points more for Mathematics (p=0.03) and 6 percentage points more for the PAT reading test; their reading age was around 6 months higher than others. On average, they scored 2 percentage points more than others, and 4 percentage points more for the Composite Cognitive Competency.

Provision of resources had the strongest associations, as the next table shows.

Table 78

Help with Homework—Provision of Resources and Children's Competencies at Age 8

Help with Homework—Provision of Resources→ Competency↓	yes n=51	no n=470	Probability
Perseverance	71.7	*65.6*	0.054
Communication	74.1	*69.5*	0.041
Mathematics	69.0	*62.5*	0.055
PAT reading score	50.0	*38.5*	0.00040
Burt word reading test	53.1	*46.6*	0.0076
Logical Problem-Solving	50.8	*46.2*	0.046
Composite Competency	67.9	*63.6*	0.011
Composite Cognitive Competency	59.0	*52.9*	0.0055

The highest scores for each competency are in **bold** type, the lowest in *italics*.

We then looked to see if taking family income and mother's education into account would show different patterns. Parents in the lowest income group were most likely to be helping their children with their homework (53 percent compared with 34 percent for other income groups). All the negative associations with helping children with their reading still remained after taking family income into account.

Help with reading homework did not reflect different levels of maternal education. The negative associations with children's competencies continued after we took maternal qualification into account; the difference between children who did not have help with reading and those who did was most marked for children whose mother's highest qualification was School Certificate or University Entrance.

These continued associations reinforce our interpretation above, that it is the children in need of help who get it. At age 10 we can explore whether this makes a difference for low performing children, by comparing the progress of low performing children at age 8 who had such parental support with those who did not have it.

The negative association between Mathematics and parental help with mathematics homework also continued after taking family income and maternal qualification into account.

The positive associations with parental help with projects continued after we took family income and maternal qualification into account. Children in the lowest income group benefited most from having parental help with projects or research for Mathematics, writing, the PAT reading comprehension test, the Burt word reading test, and Individual Responsibility.

The proportion of parents providing supervision with homework was much the same for children in all income groups, and all levels of maternal qualifications. After we took family income into account for parental supervision of homework, the positive associations with Mathematics and the PAT reading comprehension test were no longer evident, but the associations with writing and reading age continued. There was a notable advantage for children in the lowest income group whose homework was supervised: for the Literacy competencies other than writing, they scored as well as children in the top income group. But after taking maternal qualification into account, only the association with reading age continued to be evident. Among those children who received parental supervision, there was a trend for those whose mothers' qualifications ranged from mid-school to trades to benefit most for Mathematics, taking their scores to the same as those for children whose mothers had tertiary or university qualifications.

Parental Ease in Talking to their Child's Teacher

Eighty-nine percent of the parents were comfortable talking to their child's teacher; only 34 (7 percent) had mixed feelings. Only thirteen parents were uncomfortable with their child's teacher, and 9 had never met her or him. No associations were found between parental ease in talking to their child's teacher and children's competency levels.

Parental Views of their Child's School Progress

At age 6, parental satisfaction levels with their child's initial school progress reflected the child's competency levels for 4 competencies: Literacy, Perseverance, Individual Responsibility, and

Social Skills with Adults.[75] At age 8, parental satisfaction levels reflected children's competency levels for every competency bar Logical Problem-Solving.

Table 79

Parental View of Child's School Progress and Their Competencies at Age 8

Parental View of Progress→ **Competency↓**	**satisfied** **n=342**	**satisfied but with some reservation** **n=143**	**not satisfied** **n=36**	**Probability**
Curiosity	**65.1**	60.4	*55.7*	0.00044
Perseverance	**70.1**	61.1	*49.8*	0.0000000008
Individual Responsibility	**70.1**	64.4	*52.2*	0.0000001
Social Skills with Peers	**67.4**	65.6	*58.0*	0.00004
Social skills with Adults	**74.7**	71.6	*63.0*	0.00023
Communication	**72.5**	67.2	*56.7*	0.00000009
Mathematics	**65.3**	61.7	*48.4*	0.00013
Fine Motor Skills	**84.5**	84.5	*78.2*	0.012
PAT reading score	**42.1**	37.9	*22.6*	0.000002
Burt word reading test	**50.0**	43.6	*34.8*	0.000000009
Writing score	**63.5**	57.3	*45.0*	0.00000000005
Teacher Perception of reading age	**9½-10yrs**	9-9½yrs	*8½-9yrs*	0.000000004
Logical Problem-Solving	**47.1**	46.5	*42.7*	0.28
Composite Competency	**66.0**	61.9	*52.8*	0.0000000002
Composite Cognitive Competency	**55.5**	51.7	*41.2*	0.0000006

The highest scores for each competency are in **bold** type, the lowest in *italics*.

The differences between children whose parents were satisfied and those who had some reservations were not significant for Mathematics, Social Skills with Peers, Social Skills with Adults, and Fine Motor Skills.

Parental Educational Aspirations for their Child

Parents' aspirations for their children have been linked in other research to children's academic achievement and enrolment in tertiary education (Wentzel 1998). At age 6, after taking family income into account, we found that parents whose children wanted them to go on to tertiary education did better for Mathematics, the Literacy measure of Invented Spelling, and Social Skills with Adults.

At age 8, we found that aspirations for tertiary education showed positive associations with 5 of the children's competencies.

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[75] Interestingly, parental satisfaction levels at age 6 reflected their 8 year old competency levels for only 4 competencies: Literacy, Perseverance, Individual Responsibility, and Mathematics. However, these are 4 of the 5 competencies that we found to be key to children's performance at age 8 overall.

Table 80

Parental Educational Aspirations for Child—University/Tertiary and Children's Competencies at Age 8

Parental Educational Aspirations for child—University/Tertiary→ Competency↓	yes n=282	no n=239	Probability
Social Skills with Peers	**67.3**	*65.0*	0.022
Communication	**71.3**	*68.3*	0.046
Mathematics	**67.4**	*58.1*	0.0000033
PAT reading score	**42.0**	*36.8*	0.0080
Burt word reading test	**49.3**	*44.8*	0.0021
Writing score	**62.3**	*58.6*	0.013
Logical Problem-Solving	**49.0**	*43.8*	0.00011
Composite Competency	**65.5**	*62.2*	0.0014
Composite Cognitive Competency	**56.1**	*50.4*	0.000011

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Parents in the highest income group were more likely to have tertiary aspirations for their children (63 percent, compared to 50 percent for others). When we took family income into account, we found that children whose parents wanted them to have tertiary education continued to show higher scores for Mathematics, Logical Problem-Solving, and the Burt word reading test. The associations with Communication, writing, the PAT reading test and Social Skills with Peers disappeared. Children in the lowest income group whose parents hoped they would attend university or another tertiary institution showed the most gain on the Composite Cognitive Competency. This is similar to our results at age 6.

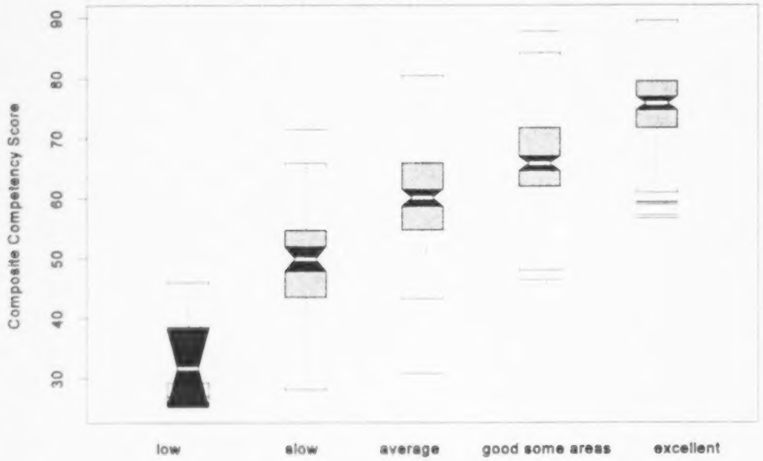
Aspirations for children to have a tertiary education were lowest amongst those mothers who had no qualification (36 percent), and lower for those whose highest qualification was at the mid-school level (48 percent, compared with 60 percent for those with senior school to tertiary qualifications, and 70 percent for those who had a university degree). Taking mother's education into account showed the same pattern of continuing and disappearing associations as we found with family income. However, the children who benefited most from their parents having high aspirations for their education were those whose mothers had a qualification in the senior school-tertiary range. This may indicate the importance of supporting aspirations with greater confidence, knowledge and awareness of what is involved in learning.

Teacher Rating of Children's School Progress

Teachers' ratings of children's initial school progress at age 6 were significantly associated with the children's competency levels for all the competencies. At age 8, this match of teachers' overall assessments of children's progress and their competency levels was even more marked, with greater differentiation between those they rated as making very/good excellent progress, and those making progress rated as average, but good in some areas.

Figure 8

Composite Competency and Teacher's View of Child's Progress Age 8



Note: Groups are not considered different if the shaded "waistlines" in boxplots overlap on the score scale. None of these waistlines overlap; these groups are all quite distinct.

Table 81

Teacher's View of Child's Progress and Their Competencies at Age 8

Teachers' View of Child's Progress - Competency↓	minimal /very low n = 6	slow/ below average n = 73	average/ medium n = 151	average, but good in some areas n = 168	very good/ excellent n = 125	Probability
Curiosity	*36.5*	53.2	59.3	66.0	**70.8**	0
Perseverance	*11.5*	43.6	61.6	68.2	**84.6**	0
Individual Responsibility	*21.7*	50.3	64.2	67.2	**82.8**	0
Social Skills with Peers	*45.3*	60.1	65.5	66.6	**71.3**	0.000000000008
Social skills with Adults	*47.9*	59.4	72.5	74.1	**81.2**	0
Communication	*36.6*	52.1	65.9	72.6	**82.9**	0
Mathematics	*29.0*	38.4	55.8	69.1	**79.3**	0
Fine Motor Skills	*74.2*	78.7	81.6	85.3	**89.0**	0.0000000002
PAT reading score	25.4	*19.2*	31.3	43.2	**57.0**	0
Burt word reading test	34.0	*30.4*	41.0	50.2	**60.7**	0
Writing score	*26.2*	45.2	57.9	63.6	**70.1**	0
Teacher's perception of reading age	*7-7½yrs*	8-8½yrs	8½-9yrs	9½-10yrs	**10½-11yr**	0
Logical Problem-Solving	*2.3*	37.8	40.8	48.8	**56.5**	0
Composite Competency	*32.0*	49.4	60.1	66.2	**75.2**	0
Composite Cognitive Competency	*34.4* *29.2*	36.5	47.7	57.0	**66.2**	0

The highest scores for each competency are in **bold** type, the lowest in *italics*.

The proportion of variance accounted for by teacher assessments ranged from 11.4 percent to 54.7 percent, with the mode in the 30s. Using this as a guide to the criteria teachers might be using in making overall assessments, the factors which seemed to matter least in their estimation of children's overall progress were Fine Motor Skills, Social Skills, Curiosity, and Logical Problem-Solving. Social Skills and Curiosity were teacher assessed.

A similar pattern was found among parents, but their degree of satisfaction accounted for a much lower proportion of variance, ranging from 0.5 percent to 9.1 percent.

Summary

The school factors we looked at are drawn mainly from other research findings and parental and teacher questions or suggestions. The proportion of variance explained by the school factors lies mostly between 1 and 6 percent, with the exception of teachers' overall assessments. Studies of school effectiveness, which are based on average scores and take the school rather than the individual child as their unit of analysis, have found between 8 to 15 percent of the difference in children's achievement to be due to differences in school characteristics (Reynolds et al 1994).

The size of the gaps between children related to various school factors is not insubstantial. The impact of school factors ranged from 3.2 to 21.6 percentage point difference. As with the ECE factors, there were strong impacts with Mathematics and the PAT reading comprehension test, moderate contributions to Logical Problem-Solving, and modest contributions to other competencies (though school attendance had strong impacts for Perseverance and Individual Responsibility, with the caveat that this trend is based on very small numbers of children with poor attendance).

We found that the socioeconomic composition of a school, as measured by the Ministry of Education's decile ranking, does make an additional contribution to children's Literacy, Mathematics and Logical Problem-Solving competency levels, over and above their individual family income. Taking age-5 scores into account continued to show the school decile attended by children had an influence of its own for Literacy and Logical Problem-Solving, showing lower scores for children attending decile 1–2 schools.

Our data on children's experiences of their classrooms underscore the negative impacts of friction between children, competitiveness, the difficulty of the work, and lack of satisfaction or enjoyment. However, children don't need to be friends with everyone in the class, as long as they have some friends.

We can perhaps allay the fears of some parents about the negative effects for their children of being in composite or open plan classes. We found only one clear negative association between composite classes and children's competencies, with Mathematics.

However, it is of concern that the proportion of children in a class whose English is a second language was starting to show associations. This is in line with the findings reported in the next chapter for individual children's home language.

Regular school attendance was particularly beneficial for children whose mothers had little formal education, and parental supervision of homework was particularly beneficial for children from low income homes.

Voluntary parental involvement with the school also made a difference, in contrast to parental involvement in early childhood education. If the more structured nature of school calls on greater perseverance, commitment and creation of "product", does parental involvement with the school work in relation to children's competency levels by conveying the value of this to children—a value which might not have been so necessary in relation to early childhood education?

Parents' views of their children's school progress were much better matched to the children's competency levels than they had been at age 6. Teachers' overall assessments continued to provide a sound guide to children's progress relative to each other in specific competencies.

CHAPTER 9

GENDER, ETHNICITY, HEALTH, AND LANGUAGE AND CHILDREN'S COMPETENCIES

In this chapter we analyse the children's competencies in relation to their gender, ethnicity, health and first language.

Gender

We saw in Chapter 6 that parents of boys were less satisfied with their school progress, and thought they were less enthused with school.

In this study, we found only 2 associations between gender and children's competencies at age 5. Girls were 7 percentage points ahead of boys on Perseverance, and boys were 6 percentage points ahead of girls on Curiosity. There was an indicative association with Literacy, with girls 6 percentage points ahead of boys. These differences remained after allowing for family income and maternal qualifications.

But at age 6, only 2 competencies—Mathematics and Fine Motor Skills—showed *no* associations with gender. Girls performed better than boys overall, with an average advantage of 3 percentage points per competency on the composite competency measure (p = 0.008). Boys did better than girls only on Logical Problem-Solving and Curiosity.

At age 8, boys did better than girls only on Curiosity. But there were no gender differences evident for Mathematics,[76] Logical Problem-Solving, or Fine Motor Skills. The score gaps between girls and boys widened between age 6 and age 8 for Perseverance, Individual Responsibility, Social Skills with Adults, and Communication. Three of these competencies were emerging as central to children's performance overall.[77]

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[76] There were no gender differences found for 9 year olds in the second IAEP study involving 14 countries (Brusselmans-Dehairs, Henry, Beller, Gafni 1997, p. 56); there was a gender difference found in 6 of the 26 countries participating in the TIMSS study, and for New Zealand, girls' mean mathematics scores were higher than boys', but not significantly higher (Chamberlain 1997, pp 68–69).

[77] Fergusson and Horwood (1997) present data from the longitudinal Christchurch Health and Development study showing gender differences in reading, mathematical and general intelligence tests from ages 8–18, school certificate grades and leaving school without a qualification. When these achievement scores were adjusted for gender differences in attention and conduct as rated by teachers no significant differences between males and females remained, indicating that boys' lower scores were attributable to their lower levels of attention and conduct. Our findings are congruent with this analysis.

Table 82

Gender and Children's Competencies at Age 8

Child's Gender → Competency ↓	female n = 252	male n = 271	Probability
Curiosity	*61.5*	**64.5**	0.044
Perseverance	**71.5**	*61.2*	0.000000028
Individual Responsibility	**75.0**	*60.0*	0
Social Skills with Peers	**69.8**	*63.0*	0.000000000012
Social Skills with Adults	**76.9**	*69.3*	0.00000018
Communication	**73.4**	*66.6*	0.00000087
PAT Reading score	**43.0**	*36.3*	0.00065
Burt word reading test	**49.6**	*44.8*	0.00089
Writing score	**63.5**	*57.8*	0.00011
Teacher perception of reading age	**9½-10yrs**	*9-9½yrs*	0.00061
Composite Competency	**66.7**	*61.4*	0.00000015
Composite Cognitive Competency	**55.2**	*51.8*	0.0086

The highest scores for each competency are in **bold** type, the lowest in *italics*.

We had an imbalance of girls and boys in the group of children who came from the lowest income families. Girls made up only 30 percent of this group, although they made up 48 percent of the overall study sample. To check that the associations we were seeing with gender were not influenced by this, we included family income at age 8 in our modelling. Gender continued to have an impact of its own. We did find indications for Individual Responsibility that boys' scores were more affected by family income levels than girls' scores were, but there was no clear linear trend. Boys in the highest income and low income groups scored around 10 percentage points more than those in the lowest income and middle income groups.

Allowing for mother's education also made no difference to the associations between children's competency levels and their gender.

Ethnicity

At age 5, children's ethnicity had shown significant associations with Communication and Literacy, and indicative associations with Individual Responsibility, Social Skills with Adults and Mathematics. But when family income was taken into account, only two differences remained: Pacific Island children at age 5 scored significantly lower on Communication and Literacy.

At age 6, associations were found between ethnicity and Literacy, Mathematics, and Communication. Only the association with the Literacy measure of Invented Spelling remained after taking family income into account.

At age 8, we found associations with Literacy, Mathematics, Communication, Social Skills with Adults, and Logical Problem-Solving. The significant differences were between Pakeha/European children, and Māori or Pacific Island children. Asian children also scored more than the latter two groups for Logical Problem-Solving, and higher than Pacific Island children for the PAT reading test.

Pakeha/European and Asian families were much more likely to be in the high income bracket (42 and 50 percent respectively, compared with 22 percent Māori and 4 percent Pacific Island families). Māori and Pacific Island families were most likely to be in the lowest and low income groups.

When we took family income into account, the associations with Communication, the Burt word reading test and the writing measure disappeared. The associations with Mathematics, PAT reading comprehension test, reading age, Logical Problem-Solving, and the composite competencies remained, albeit diluted.

Pakeha/European children in the top income group scored higher than other Pakeha/European children for Mathematics, with no differences between the other 3 income groups. There was a different income-related pattern amongst Māori and Pacific Island children. For these ethnic groups, income made a sharper and more linear difference. Māori and Pacific Island children in the lowest income group had the lowest scores, those in the low and middle income groups had middling scores, and the highest scores for Māori and Pacific Island children were for those in he highest income group.

Marked differences between ethnic groups also existed in relation to maternal education. For example, Māori and Pacific Island mothers were twice as likely to have no formal qualifications as Pakeha/European mothers, though they had much the same proportion of trade and tertiary qualifications. When we took maternal education into account, we found much the same pattern as when we took family income into account: the Burt word reading test, writing measure and Logical Problem-Solving associations were no longer significant, and the associations which remained were diluted.

Health

At age 5, child's overall health status was associated (indicatively) with only 1 competency: Social Skills with Peers. Children with continuing hearing problems were behind others on Social Skills with Peers, Literacy and Logical Problem-Solving. All these differences disappeared when family income was taken into account.

At age 6, we found no associations with overall health status. However, children who had had no hearing problems at age 5 did score higher than those who had a hearing problem, corrected or uncorrected, for all competencies bar Curiosity and Fine Motor Skills.

At age 8, overall health status appears to have more weight, though caution needs to be exercised with this conclusion given the low number of children in the study whose parents described their health as fair to bad.

Table 83

Child's Health and Their Competencies at Age 8

Child's Health at age 8 → **Competency ↓**	**excellent/ very good n = 349**	**good/OK n = 163**	**fair to bad n = 9**	**Probability**
Perseverance	**67.7**	63.7	*54.2*	0.030
Individual Responsibility	**68.6**	65.2	*56.7*	0.049
Mathematics	**65.3**	59.6	*39.4*	0.00041
PAT reading score	**41.2**	37.2	*22.0*	0.012
Writing score	**61.8**	58.9	*44.0*	0.0037
Teacher perception of reading age	**9½-10yr**	9-9½yrs	*8-8½yrs*	0.020
Logical Problem-Solving	**47.9**	44.7	*32.3*	0.0029
Composite Competency	**64.9**	62.4	*57.0*	0.015
Composite Cognitive Competency	**54.8**	51.5	*35.9*	0.00018

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Children whose health was excellent/very good and those whose health was good showed no differences for writing, or reading age.

Hearing status at age 5 now showed only one, indicative, association, and that—curiously—with Curiosity. The average score for the 28 children who had had a hearing loss at age 5, or whose hearing was then being monitored, was 8 percentage points more for Curiosity than for the 15 children who had had a hearing problem corrected.

English as a Second Language

At age 5, children whose first language was English scored significantly better than those with English as a second language on Communication, Social Skills with Adults, Social Skills with Peers, and Literacy. Most of the children whose first language was not English were attending A'oga Amata, so they had teachers who spoke their home language, and shared their home culture. So the measurements were usually made by adults who shared the child's first language. These differences disappeared once family income was taken into account.

At age 6, children with English as a second language were 9 percentage points behind others on Communication. This was an indicative association only.

At age 8, however, we found differences for all the competencies[78] bar writing and Fine Motor Skills.

Table 84

English as Second Language and Children's Competencies at Age 8

English as second language for child - Competency ↓	**English first language n=499**	**English second language n=22**	**Probability**
Curiosity	**63.5**	*53.4*	0.0065
Perseverance	**66.6**	*56.2*	0.025
Individual Responsibility	**68.0**	*52.3*	0.00024
Social Skills with Peers	**66.5**	*61.6*	0.044
Social Skills with Adults	**73.7**	*57.4*	0.000063
Communication	**70.6**	*55.6*	0.000030
Mathematics	**64.0**	*43.0*	0.000025
PAT Reading score	**40.3**	*23.3*	0.00040
Burt word reading test	**47.6**	*37.0*	0.0033
Teacher perception of reading age	**9½-10yrs**	*8-8½yrs*	0.00019
Logical Problem Solving	**46.8**	*41.1*	
Composite Competency	**64.5**	*53.5*	0.000013
Composite Cognitive Competency	**54.0**	*42.2*	0.00026

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Children whose English was their second language were almost twice as likely as those whose English was their first language to have family incomes of $30,000 or less. After taking family income into account, all the associations bar those with Perseverance and Social Skills with Peers remained, albeit diluted. In terms of the Composite Cognitive Competency, children in the lowest income group whose first language was not English were 13 percentage points behind their peers; this gap narrowed to 8 percentage points for those whose family incomes were above $20,000. A similar pattern was evident when we looked at a composite of the social competencies.

Summary

The impact of "personal" factors which are socially situated, and subject to social values — gender, ethnicity, health, and English as a second language — on children's competency scores ranged from 3 to 16 percentage points. Other than for Perseverance and Individual

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[78] The IEA Reading study found New Zealand had the largest difference of 27 countries in scores between children whose first language was not the language of instruction (English for New Zealand), and those for whom it was (Wagemaker 1993, p. 53).

Responsibility, the impact of gender was usually less than the other factors in this group. The impact for ethnicity, health, and English as a second language was modest for Social Skills with Peers, tended to moderate strength for other competencies, and strong for Mathematics, PAT reading comprehension, and Logical Problem-Solving.

The impact of the four factors included in this chapter has grown since the children were aged 5, and again since age 6. In Chapter 2, the analysis of children's progress over the three years showed that boys and Māori and Pacific Island children found it harder to hold onto their initial progress, if it had been high, and showed less stability for boys than for girls. It is pleasing to see that we found no difference between boys and girls in relation to Mathematics; this may indicate that some of the effort of the last 10–15 years on improving girls' mathematics is paying off. The current identification of concern with closing the gaps between boys and girls scores in reading and writing particularly may also show gains over time if appropriate strategies are identified.

However, while there has been much discussion of the need to improve Māori children's achievement, it is very disquieting that ethnic differences favouring Pakeha/European and Asian children are now evident in the data from this study, even after taking family income into account.

This study can show *the fact that* these gaps have opened out between the ages of 6 and 8, and suggest different patterns, but it cannot show *why* this is so. More qualitative work is needed to follow children through both at home and at school.

CHAPTER 10

FAMILY RESOURCES AND CHILDREN'S COMPETENCIES

What Really Matters?

In this chapter, we examine the associations between family and home resources at age 8 and children's competency levels at age 8. We also look at any changes taking place in the years between 5 and 8. We have included earlier levels of some resources, such as family income, at age 5, in order to explore further the continuing impact of earlier resources and experiences on children's competency levels which we found in our analysis at age 6.

In our first report we found that a number of family resource related factors which showed associations with children's competencies when looked at by themselves were actually "standing in" for family income differences. We report both, to show the difference between looking at such factors alone, and taking family income into account. Our analysis shows that unless we look at other family related resource factors in the light of family income differences, we are likely to misrepresent and magnify the role of those other factors in children's lives. In our two factor analysis, we have focused on those factors which appear to be of most current interest in social and educational policy.

Family Income

Only Curiosity and Fine Motor Skills show no associations with family income levels in our analyses at ages 5, 6, and 8. At age 6, an association emerged for Logical Problem-Solving, and this remains at age 8. Previously we found that family income levels at age 5 were more strongly associated than family income levels at age 6 with 5 competencies. At age 8, family income levels at age 5 remained more strongly associated than current family income with 4 of these competencies—Mathematics, Literacy, Individual Responsibility, and Logical Problem-Solving— but not with Social Skills with Peers. Current family income levels were more important for Perseverance and Social Skills with Adults, as they had been at age 6.

Table 85

Family Income at Age 5 and Children's Competencies at Age 8

Family Income at age 5 - (N = 509) Competency ↓	Income < $20K n = 94	Income $20K-$30K n = 48	Income > $30K-$60K n = 222	Income > $60K n = 145	Probability
Perseverance	*60.4*	60.7	67.4	**69.7**	0.0018
Individual Responsibility	*60.1*	65.9	67.9	**71.3**	0.0002
Social Skills with Peers	*62.6*	64.7	66.6	**68.9**	0.0003
Social skills with Adults	*67.7*	71.2	74.1	**75.4**	0.004
Communication	*65.5*	66.7	70.4	**72.8**	0.004
Mathematics	*53.1*	55.9	63.9	**71.4**	0.000000002
PAT reading	*29.7*	33.2	39.5	**48.1**	0.0000000006
Burt word reading test	41.4	*40.9*	47.8	**52.2**	0.0000005
Writing score	*56.0*	56.6	60.8	**64.6**	0.0004
Teacher perception of reading age	9-9½yrs	*8½-9yrs*	9½-10yrs	**10-10½yrs**	0.00006
Logical Problem-Solving	42.8	*41.6*	45.9	**52.3**	0.0000007
Composite Competency	*59.3*	60.2	64.4	**67.9**	0.00000003

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Table 86

Family Income and Children's Competencies at Age 8

Family Income at age 8→ (N=508) Competency↓	Income <$20K n=62	Income $20K-$30K n=51	Income >$30K-$60K n=205	Income >$60K n=190	Probability
Perseverance	*59.0*	66.9	64.0	**70.6**	0.0006
Individual Responsibility	*61.0*	67.1	65.4	**71.1**	0.002
Social Skills with Peers	*63.4*	64.7	64.8	**69.1**	0.0003
Social skills with Adults	*67.6*	67.9	72.7	**76.4**	0.0006
Communication	*66.2*	67.0	68.5	**73.2**	0.004
Mathematics	*54.8*	57.6	60.2	**70.1**	0.0000005
PAT reading	*31.2*	33.9	36.4	**47.2**	0.00000001
Burt word reading test	43.9	*41.3*	45.1	**52.1**	0.000002
Writing score	*57.8*	58.9	58.3	**64.3**	0.001
Teacher perception of reading age	*9-9½yrs*	*9-9½yrs*	*9-9½yrs*	**9½-10yrs**	0.0004
Logical Problem-Solving	*42.7*	45.4	45.0	**50.0**	0.001
Composite Competency	*59.6*	61.8	62.3	**67.7**	0.0000002
Composite Cognitive Competency	*48.2*	50.2	51.0	**58.5**	0.00000002

The highest scores for each competency are in **bold** type, the lowest in *italics*.

There were 3 main patterns at age 6:

- differing Mathematics and Word reading scores for those with family incomes above and below $30,000
- an advantage for children from the highest family income homes (above $60,000) for Perseverance, Communication, Social Skills with Peers, and Social Skills with Adults
- lower scores on Logical Problem-Solving and the Literacy measure Invented Spelling for children from homes with incomes of $20-30,000 (the low income group).

At age 8, there were some changes to this pattern.

- those who came from the highest family income homes at age 5 scored higher on average for a slightly different set of competencies: Mathematics, the four Literacy measures, Logical Problem-Solving, and Social Skills with Peers
- children with family incomes at age 5 of less than $30,000 scored lower for Perseverance
- those whose current family incomes were $20,000 or less scored lower than those from families with incomes above $30,000 for Communication, Social Skills with Adults, and Individual Responsibility

In terms of current family income, the main split came at $60,000 or more, with children from these homes showing higher average scores for Mathematics, the four Literacy measures, Communication, and Social Skills with Peers, and, in contrast to children from families with income below $20,000 or between $30,000-$60,000, for Perseverance, Individual Responsibility, and Logical Problem-Solving.

Family income levels are important for children's competency levels, but there is no direct linear correlation. It seems to be the additional resources available to the highest income families which enable their children to perform better than others, particularly for the cognitive competencies. Many of these families are "work-rich", double-income families.

Proportion of Income Spent on Housing

Our previous findings of the associations between children's competencies and the proportion of family income going to housing showed that while children whose families spent less than a quarter of their income on housing tended to perform better than others, children from families spending more than 50 percent did just as well. This appeared to be largely because of the higher number of high income families in this group. At age 8, the patterns are more clear-cut. Children from families which spend less than 25 percent of their income on housing have higher scores than others.

Table 87

Proportion of Income Spent on Housing and Children's Competencies at Age 8

Percent Income spent on Housing at age 8→ Competency↓	≤25% n=231	33% n=131	50% n=77	>50% n=40	**Probability**
Perseverance	**69.4**	64.3	62.3	62.0	0.016
Individual Responsibility	70.0	65.8	62.0	63.1	0.0059
Social Skills with Peers	67.7	65.1	65.8	60.5	0.0049
Mathematics	**66.8**	60.8	58.2	52.5	0.00034
PAT reading	**42.2**	37.7	37.4	31.8	0.023
Writing score	**62.7**	58.4	60.2	56.5	0.039
Teacher perception of reading age	**9½-10yrs**	*9-9½yrs*	*9-9½yrs*	*9-9½yrs*	0.0047
Logical Problem-Solving	**49.3**	43.9	44.4	41.2	0.00049
Composite Competency	**65.9**	62.8	61.8	59.7	0.0014
Composite Cognitive Competency	**56.1**	51.3	51.1	47.1	0.00028

The highest scores for each competency are in **bold** type, the lowest in *italics.*

Sixty-three percent of the high income families spent a quarter or less of their income on housing, dropping to 25 percent of those on the lowest incomes. When we took family income into account, only the associations with Mathematics, Logical Problem-Solving, and the Composite Cognitive Competency remained. Children in the lowest income groups were the ones who seemed most affected by the proportion of income spent on housing for Individual Responsibility, Social Skills with Adults, the Composite Competency, and the Composite Cognitive Competency, with marked advantages to those children whose families were able to spend less than 50 percent of their income on housing.

We also looked at the proportion of family income spent on housing at age 5 in relation to children's competencies at age 8, and found the same pattern, of an advantage to children whose parents had been able to spend the greater proportion of their income on things other than housing. Indeed, housing expenditure at age 5 had a greater impact (that is, it explained more of the variance between children's scores) for age 8 scores than did housing expenditure at age 8.

Table 88

Proportion of Income Spent on Housing at age 5 and Children's Competencies at Age 8

Percent Income spent on Housing at age 5→ Competency↓	≤25% n=102	33% n=73	50% n=50	>50% n=24	**Probability**
Perseverance	70.9	63.5	66.0	*57.0*	0.015
Social Skills with Peers	**68.9**	65.8	62.7	*62.5*	0.0050
Mathematics	**69.4**	62.2	*57.8*	59.6	0.010
PAT reading	**46.1**	38.2	37.9	*32.2*	0.013
Logical Problem-Solving	**50.9**	48.1	*41.3*	49.8	0.0021
Composite Competency	**67.6**	63.2	61.5	*61.0*	0.0039
Composite Cognitive Competency	**58.2**	52.6	50.3	51.4	0.0052

The highest scores for each competency are in **bold** type, the lowest in *italics.*

Main Source of Family Income

At age 6, we found associations between a family's main income source, and Individual Responsibility, Perseverance, Communication, and one of the two Literacy measures, Word reading. None of these associations remained once we took family income into account. At age 8, the association with Communication remained, with some new differences showing.

Table 89

Main Income Source and Children's Competencies at Age 8

Main Income Source → Competency ↓	Wages n=334	Self Employed n=68	Wages + Self-Employed n=34	DPB n=51	Other Benefit n=32	Probability
Curiosity	62.1	65.9	**72.2**	65.0	*56.6*	0.0010
Social Skills with Peers	67.0	**68.1**	63.0	*62.2*	64.6	0.022
Social Skills with Adults	73.9	73.5	**74.8**	70.2	*65.2*	0.054
Communication	69.8	**73.8**	73.4	68.2	*62.8*	0.014
Mathematics	63.3	**67.9**	66.2	58.6	*53.9*	0.032
PAT reading	40.4	41.6	**46.4**	*31.8*	32.5	0.0082
Composite Competency	64.2	66.0	65.5	61.6	*59.5*	0.052

The highest scores for each competency are in **bold** type, the lowest in *italics*.
Note: 17 of the 51 Domestic Purposes Benefit (DPB) recipients also received wages.

The contrasts were usually significant only between the group receiving "other benefits' (unemployment or sickness), and others.

Seventy-one percent of the DPB recipients received less than $20,000. When we took family income into account, only the association with Curiosity remained. This showed an advantage for children whose family income came from both wages and self-employment, which usually meant that both parents were employed, compared with children from families reliant on wages alone, or benefits. Children from sole-parent families receiving the DPB scored more highly on average than those whose parents received unemployment or sickness benefit. There were no significant differences between children whose families received benefits and those whose main income was from wages or self-employment.

Family Type

After taking family income into account, only one association favouring children from two-parent families was found at age 5, with Social Skills with Peers, and at age 6, with Individual Responsibility. At age 8, we found different associations again, favouring children from two-parent homes on the Literacy measures of PAT reading comprehension by 6 percentage points (p=0.022), and on reading age, by 5 months (p=0.046).

Fifty-four percent of sole-parent families had incomes of $20,000 or less, compared with 5 percent of the two-parent families in the study. When we took family income into account, these associations disappeared.

Mothers in sole-parent families were twice as likely as those in two- parent families to have no qualification. After allowing for maternal qualification, there were no significant associations left between family type and children's competencies.

The only difference evident between children with different family type experiences between the ages of 5 and 8 was that children who had been in sole-parent homes for these 3 years were marginally more likely to have lower PAT reading scores than those who had been in two-parent homes (10 percentage points difference, p=0.03). But there was no difference between children who had been in two-parent homes the whole time, and those whose homes had been sole-parent for part of the time.

When we looked at those whose two-parent families remained intact and those who were or had been in sole parent families, we found an advantage for the children of two-parent homes for Perseverance (6 percentage points), for Social Skills with Peers (4 percentage points), and for the PAT reading test (7 percentage points).

Seventy-eight percent of the lowest income group at age 8 had been sole parents for some or all of the child's previous 3 years, as had 41 percent of those who were in the low income group, 13 percent of the middle income group, and 5 percent of the top income group. But when we took family income into account, the associations with family type over 3 years were no longer evident. However, there were indications that children in the lowest income bracket who lived in sole-parent families for the entire 3 year period (between the ages of 5 and 8) were likely to score less than their two-parent peers in the same income bracket for Perseverance, Social Skills with Peers, the PAT reading comprehension test, Individual Responsibility, and Mathematics. We did not analyse this difference further to see if it reflected stability or change in income over time: two-parent families have a greater opportunity to add income through employment.

There were no differences evident between sole-parent and two-parent families in the other income brackets.

Household Size

Most children came from households with 4 people (33 percent), or 5 people (31 percent). Fourteen percent lived in households of 2 or 3 people, and 22 percent, 6 or more people. We found a few indicative differences. Children from households with less than 3 people scored 6 percentage points less for Individual Responsibility, and 4 percentage points less for Social Skills with Peers. Children in households of 4–5 people scored 6 percentage points more for Mathematics than those from households of 6 or more people. It seems likely that these differences might not endure if we were to take family income or family type into account.

Family Stability

We looked at changes in relations between parents in families which had been two-parent families when the child turned 5. Seventy-three percent of these families remained as they were; 13 percent experienced parental separation, and 7 percent experienced a new partner. Only one association was apparent, with Social Skills with Peers. Children in intact homes scored 3–4 percentage points more than others (p=0.013).

Family income levels overlapped with family stability. The break-up of families often means a fall in income levels, since there is only one parent available for paid employment, and that parent has the prime responsibility for the care of children. After we took family income into account, the association between family stability and Social Skills with Peers was no longer evident.

Housing Stability

Thirty-seven percent of the children remained in the house they were born in. Thirty percent had moved house once, 20 percent 2 or 3 times, and 13 percent 4 times or more. We found only a few indicative associations between children's competencies and the number of times their family had shifted house. Children who had stayed in the same house scored 4 percentage points more on average for Curiosity, Perseverance, and Mathematics.

Maternal Employment Status

At age 5, children whose mothers were in paid employment did better than others on Literacy; and at age 6, on Mathematics, Social Skills with Peers, and Perseverance. At age 8, we see yet another pattern, suggesting that factors other than maternal employment status itself may be at work. Children of mothers in part-time employment had higher scores for Curiosity than those whose mothers were employed full-time (5 percentage points), or who were not in paid work (4 percentage points). They did better than children of mothers who were not in paid work on Perseverance (6 percentage points) and Social Skills with Adults (5 percentage points). Overall, on the Composite Competency, the advantage was small: 2 percentage points compared to children whose mothers were employed full-time, and 3 percentage points for those whose mothers were not in paid work.

Parental Occupations

We analysed both parents' former occupations and their current occupations for their associations with children's competency levels, in order to see if the enduring effects seen for family income were also evident in relation to differences in knowledge, social contacts and other resources which are often linked to differences in parental occupations. We also looked at current family income alongside former and current parental occupation.

Maternal Occupation at the Birth of the Family's First Child

We found more associations at age 6 than at age 5 between the mother's occupation at the birth of her first child and children's competency levels. At age 8 we found as many associations, but a different pattern: continuity for Communication, Mathematics and Literacy, but the addition of Logical Problem-Solving, and some changes in Social Skills and Perseverance.

Table 90

Maternal Occupation at the Birth of the Family's First Child and Children's Competency Scores at age 5, 6 and 8

	age 5	age 6	age 8
Mathematics	+*	+	+
Literacy	+	+	+*
Communication		+*	+
Logical Problem-Solving			+
Social Skills with Peers	+*		+
Social Skills with Adults		+	
Perseverance	+	+*	
Individual Responsibility		+	
Fine Motor Skills			+

*Strongest associations starred

The size of the gaps between different groups narrowed between age 5 and age 6 for Mathematics, but widened again between age 6 and age 8. The next table gives the detail of the associations found at age 8. There were no significant differences between children whose mothers had had professional or skilled work for Social Skills with Peers, Communication, Fine Motor Skills, or reading age. There were no significant differences between children whose mothers had skilled or unskilled work for Social Skills with Peers and the Literacy measures, other than reading age.

Table 91

Mother's Occupation at the Birth of the First Child and Children's Competencies at Age 8

Mother's Occupation at the birth of the first child→ Competency↓	**Professional n=81**	**Skilled n=141**	***Unskilled n=31***	**Probability**
Social Skills with Peers	**69.0**	65.7	*61.9*	0.0074
Communication	**72.9**	70.1	*62.8*	0.012
Mathematics	**72.0**	61.2	*51.5*	0.000011
Fine Motor Skills	**87.3**	84.0	*82.0*	0.035
PAT reading	**48.7**	38.4	*31.2*	0.000081
Burt word reading test	**52.5**	45.2	*41.5*	0.00076
Writing score	**64.5**	59.0	*53.8*	0.0049
Teacher perception of reading age	**9½-10yrs**	9½-10yrs	*8-8½yrs*	0.020
Logical Problem-Solving	**51.7**	47.5	*39.1*	0.00020
Composite Competency	**68.0**	63.5	*58.1*	0.00012
Composite Cognitive Competency	**59.7**	52.5	*45.2*	0.0000021

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Paternal[79] Occupation at the Birth of the Family's First Child

Children's competency scores have an even broader range of relationships with paternal occupation at the birth of the family's first child. Like the associations with maternal occupation, these associations continue to be evident, and sometimes grow stronger, as the children grow older.

Table 92

Paternal Occupation at the Birth of the Family's First Child and Children's Competency Scores at age 5, 6 and 8

	age 5	**age 6**	**age 8**
Mathematics	+	+	+*
Literacy	+	+	+*
Communication		+	+*
Logical Problem-Solving		+	+*
Social Skills with Peers	+*	+	+
Social Skills with Adults	+	+	+*
Perseverance	+	+	+
Individual Responsibility	+		+
Curiosity	+	+*	+

*Strongest associations starred.

The next table shows the associations at age 8 between children's competencies and paternal occupation. Most of the differences between children whose fathers had professional work and those whose fathers were in unskilled work are at least 10 percentage points. However, the differences between children whose fathers were in professional work and those who had been in unskilled work were not significant for Curiosity, Perseverance, Social Skills with Adults, Communication, or the Literacy tasks, other than the PAT reading test. The differences between children whose fathers had been in skilled work, and those in unskilled work, were not significant for Individual Responsibility, Social Skills with Peers, and the PAT reading test. As with family income, there is no direct, linear relationship between occupational level and children's competency scores.

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[79] This refers to the partner of the child's mother when the child was aged 5.

Table 93

Paternal Occupation at the Birth of the First Child and Children's Competencies at Age 8

Paternal Occupation at the birth of the first child → Competency ↓	**Professional n = 69**	**Skilled n = 121**	**Unskilled n = 31**	**Probability**
Curiosity	**64.6**	62.9	*54.4*	0.016
Perseverance	71.7	68.2	*59.9*	0.034
Individual Responsibility	**72.8**	67.9	*61.9*	0.032
Social Skills with Peers	70.5	66.1	*62.9*	0.0037
Social Skills with Adults	74.9	75.8	*65.3*	0.027
Communication	73.6	72.0	*59.6*	0.0034
Mathematics	72.2	63.7	*48.4*	0.0000020
PAT reading	49.0	40.3	*32.4*	0.0012
Burt word reading test	**51.4**	47.3	*38.6*	0.0014
Writing score	**63.6**	61.0	*49.0*	0.00015
Teacher perception of reading age	10-10½yrs	9½-10yrs	*8½-9yrs*	0.0023
Logical Problem-Solving	54.7	47.5	*39.8*	0.0000035
Composite Competency	**68.6**	64.9	*56.4*	0.0000048
Composite Cognitive Competency	60.2	54.0	*43.5*	0.00000047

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Current Maternal Occupation

Looking only at mothers who were employed when the children in the study were aged 8, we found much the same pattern of associations with maternal occupation at the birth of the first child, with the addition of Curiosity, and the loss of Social Skills with Peers. The strength of the associations was also slightly reduced for some competencies.

Table 94

Mother's Occupation when Child Aged 8 and Children's Competencies at Age 8

Mother's Occupation when child aged 8 → Competency ↓	**Professional n = 125**	**Skilled n = 168**	**Unskilled n = 72**	**Probability**
Communication	74.4	69.1	*67.8*	0.0066
Mathematics	70.5	63.7	*54.6*	0.0000078
Fine Motor Skills	**86.5**	*83.0*	83.6	0.040
PAT reading	**48.1**	39.3	*30.8*	0.00000046
Burt word reading test	**52.5**	47.1	*42.6*	0.00016
Writing score	**65.2**	59.1	*57.5*	0.00097
Teacher perception of reading age	**9½-10yrs**	9½-10yrs	*9-9½yrs*	0.045
Logical Problem-Solving	**51.4**	45.4	*43.6*	0.00040
Composite Competency	**68.2**	63.2	*61.2*	0.000050
Composite Cognitive Competency	**59.3**	52.9	*48.1*	0.00000027

The highest scores for each competency are in **bold** type, the lowest in *italics*.

There was also more differentiation between children whose mothers were in professional or skilled employment, apart from the Literacy measure of reading age. There were no significant differences between children whose mothers were in professional or unskilled employment for Curiosity or Fine Motor Skills.

Current Paternal Occupation

There were fewer associations with father's current occupation, and some were also slightly smaller than the associations found with the father's occupation at the birth of the family's first child. There was no difference between children with fathers in professional or skilled occupations for Perseverance, and no difference between children with fathers in skilled or unskilled occupations for Mathematics, Burt word test, writing, Logical Problem-Solving, or Fine Motor Skills.

Table 95

Paternal Occupation when Child Aged 8 and Children's Competencies

Paternal Occupation when child aged 8→ **Competency↓**	**Professional n=178**	**Skilled n=186**	**Unskilled n=49**	**Probability**
Perseverance	70.0	66.9	*59.7*	0.010
Mathematics	71.0	60.1	*56.9*	0.00000078
Fine Motor Skills	**86.4**	82.3	*81.9*	0.0013
PAT reading	**47.3**	38.0	*33.0*	0.0000043
Burt word reading test	**51.1**	46.4	*41.4*	0.00026
Writing score	**64.3**	58.7	*58.1*	0.0025
Teacher perception of reading age	**9½-10yrs**	9½-10yrs	*9-9½yrs*	0.0023
Logical Problem-Solving	**51.2**	43.9	*43.6*	0.0000085
Composite Competency	**67.6**	62.8	*60.9*	0.000021
Composite Cognitive Competency	**58.9**	51.2	*48.9*	0.000000050

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Mother's Highest Qualification when the child was 5

Maternal education is often more closely related to children's performance than paternal education (Unesco 1997:20–21). Maternal education largely took place before the children in this study were born, or while they were young. Yet, like family income and parental occupations, its impact continues and becomes more marked as the children grow older.

Table 96

Maternal Education and Children's Competencies at Age 5, 6, and 8

Competency	age 5	age 6	age 8
Curiosity	+	+	
Communication		+*	+
Mathematics	+	+	+*
Literacy	+	+	+*
Logical Problem-Solving		+	+*
Perseverance		+*	+
Individual Responsibility		+	+
Social Skills with Peers	+		+
Social Skills with Adults		+	+
(Fine) Motor Skills	+		+*

* Strongest associations starred.

The next table shows the differences for children whose mothers had different levels of qualification. Children whose mothers have a university degree tend to do best, followed by children whose mothers have a tertiary diploma, such as teaching or nursing, or a trades qualification, and then those whose education stopped with either a school qualification, or none. Note that there was only one competency showing a difference between children whose mothers left school with no qualification, and those who left with School Certificate or University Entrance, but did not pursue their education beyond school. This was the PAT reading comprehension test.

Table 97

Mother's Education and Children's Competencies at Age 8

Mother's Education → Competency ↓	**Mother Educ. None n=67**	**Mother Educ. Mid.Sch n=124**	**Mother Educ. Snr.Sch n=22**	**Mother Educ. Trade n=110**	**Mother Educ. Tertiary n=84**	**Mother Educ. Univ. n=95**	**Probability**
Perseverance	62.9	*62.1*	63.4	68.8	68.8	**70.4**	0.021
Individual Responsibility	*63.4*	64.0	67.3	**70.9**	69.0	**69.5**	0.033
Social Skills with Peers	64.3	*63.6*	68.6	68.0	67.2	**68.9**	0.003
Social skills with Adults	*69.1*	70.2	71.6	76.5	73.6	**76.0**	0.008
Communication	*66.3*	67.3	69.9	71.0	71.5	**73.3**	0.027
Mathematics	*50.9*	57.9	64.8	61.6	67.7	**76.7**	0.0000000000005
Fine Motor Skills	*80.3*	82.9	82.0	84.4	85.0	**88.0**	0.001
PAT reading	*25.5*	37.5	35.5	36.8	45.2	**51.5**	0.0000000000002
Burt Word reading test	*41.0*	43.3	43.6	47.0	51.5	**53.4**	0.0000007
Writing score	*54.5*	58.3	56.0	60.5	62.1	**66.5**	0.0001
Teachers' perceptions of reading age	*9-9½yrs*	9-9½yrs	9-9½yrs	9-9½yrs	9½-10yrs	**10/10½**	0.006
Logical Problem-Solving	*41.0*	45.0	48.9	45.3	47.6	**52.9**	0.00003
Composite Competency	*58.8*	61.3	63.5	64.9	65.9	**68.8**	0.0000001
Composite Cognitive Competency	*45.1*	50.4	52.3	52.3	56.4	**62.2**	0.0000000000004

The highest scores for each competency are in **bold** type, the lowest in *italics*.

* Mid-School refers to School Certificate and University Entrance; Senior School to Bursary and Higher School Certificate; Trades to a Trade Certificate, apprenticeship, ACA, Polytechnic Certificate or Diploma etc.; Tertiary to teaching and nursing and other professional qualifications other than those requiring or obtained by a university degree.

At age 6, we found that the maternal qualifications factor was more important than current family income for Mathematics and Literacy. At age 8, it was also more important for Logical Problem-Solving and Fine Motor Skills. The two factors cannot be separated in terms of their importance for Communication and Individual Responsibility. Family income was more important than maternal qualifications for the competencies of Perseverance, Social Skills with Peers, and Social Skills with Adults, and for one Literacy measure, reading age.

Summary

The impact of family resource factors ranged from 4.3 to 26 percentage point difference. Family resource factors had their strongest associations with Mathematics and the PAT reading comprehension test, but also with Perseverance. Family resource factors made modest to moderate contributions to all the other competencies, and modest contributions to Social Skills with Peers, and Fine Motor Skills.

The main family factors associated with children's competency levels are ones which were present at the birth of the child: maternal qualifications, parental occupations, family income levels, and the proportion of income available to a family after paying for their housing, both current and prior. Our data gives income levels for age 5; it would be very useful to have income data for previous years. Clearly these different factors are interrelated.

After taking family income into account, we find no associations remaining between children's competency levels and the source of family income, current family type, and family stability. However, we do find that family type compounded with lowest income levels over 3 years shows some disadvantages for children in sole-parent homes. This is an indication that what matters is not so much the factor itself as its duration, coupled with continuing low income.

CHAPTER 11

HOME EXPERIENCES AND CHILDREN'S COMPETENCIES

Family resources seem to make a difference for children, but how? Is it in the level of material support, such as reading and information material, and computers? Is it in the kind of family conversation, such as interpretations of the world? Is it in the kinds of experiences that children have, such as their activities and interests?

In quantitative studies, measures of the "cultural capital" available to children are often aggregate — quantities of books, for example — or anchored in material goods, such as computers. We include such measures, but we also explore specific activities. This time we asked children about the kinds of television programmes they watched as well as the amount of time they spent watching television, and we asked more detailed questions about their computer use, their reading, their use of mathematics, and their enjoyment of these activities. We also asked parents to describe for us their own leisure activities, including membership of organizations.

Family Activities Involving the Child

We asked the parents of the study children to describe the current activities which the children often did with their family. At age 6, only 5 of these 12 family activities showed associations. At age 8, there were associations with all bar social activity and exploration/special events. In some cases, only one or a few associations were found. Those showing consistent patterns of advantage were physical activity, literacy-related activities, and aesthetic-creative activities. High income families were more likely to mention physical activity, and tertiary/university qualified mothers were more likely to mention literacy activities. Children whose parents said they did not do much as a family scored lower than others except for Curiosity, Mathematics, Logical Problem-Solving, and writing. Family income, type, or maternal education were not related to parents saying they did not do much as a family.

There were no consistent patterns in relation to the family's contact with their extended family.

Home Reading Activities

The material we analyse here includes parental reading to children, parent reports of their child's enjoyment of reading, and of the number of books their child had read in the previous month, the children's reports of what they actually read, and their use of public libraries.

Parental Reading to Children

Fourteen percent of the parents never read to their children, since their children were doing their own reading. Another 28 percent read rarely to their children for the same reason. But 29 percent of the parents reported reading daily to their children, 14 percent 3–4 times a week, and 15 percent, 1–2 times a week. Children who did their own reading at age 8, or whose parents read to them, rarely tended to have higher scores than others for the Literacy measures other than writing.

Children's Home Reading

Children who said they read only the books given to them for homework scored less than others for the cognitive competencies, and Curiosity.

Table 98

Reading Only Homework Books and Children's Competencies at Age 8

Child reports reading only homework books at home → Competency ↓	*yes* *n = 33*	no n = 490	**Probability**
Perseverance	*54.0*	67.0	0.00069
Individual Responsibility	*58.5*	67.8	0.0086
Social Skills with Peers	*60.2*	66.7	0.0025
Social Skills with Adults	*66.1*	73.4	0.018
Communication	*61.9*	70.4	0.0044
Mathematics	*47.2*	64.1	0.000058
PAT reading Score	*23.9*	40.5	0.000037
Burt word reading test	*33.2*	48.0	0.00000075
Writing score	*51.6*	61.1	0.0018
Teacher perception of reading age	*8-8½*	9½-10	0.00000039
Logical Problem-Solving	*38.0*	47.2	0.0012
Composite Competency	*55.7*	64.5	0.000033
Composite Cognitive Competency	*41.3*	54.2	0.0000017

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Children who read fiction had higher scores than others on the cognitive competencies, and some social skills.

Table 99

Reading Fiction at Home and Competencies at Age 8

Child reports reading fiction at home → Competency ↓	**Reads fiction n = 442**	**Does not read fiction n = 81**	**Probability**
Individual Responsibility	**68.0**	*63.0*	0.035
Social Skills with Peers	**67.0**	*62.3*	0.0014
Communication	**70.6**	*65.8*	0.011
Mathematics	**64.4**	*55.3*	0.0012
Fine Motor Skills	**84.7**	*80.8*	0.011
PAT reading score	**41.5**	*28.6*	0.0000014
Burt word reading test	**48.5**	*39.3*	0.0000044
Writing score	**61.2**	*57.2*	0.050
Teacher perception of reading age	**9½-10yrs**	*9-9½yrs*	0.00047
Logical Problem-Solving	**47.6**	*41.2*	0.00066
Composite Competency	**64.7**	*59.8*	0.00055
Composite Cognitive Competency	**54.6**	*46.9*	0.000019

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Because only 79 percent of the boys mentioned fiction, compared with 90 percent of the girls, we included gender in our analysis. Reading fiction was more strongly associated than gender with competency levels for Mathematics, PAT reading, Burt word reading, reading age, and Logical Problem-Solving. The associations between reading fiction and Social Skills with Peers and Fine Motor Skills also continued to make a contribution of their own after allowing for gender. Girls who read fiction scored 7 percentage points more on average for Social Skills with Adults than girls who did not read fiction, but reading fiction made no difference to boys' scores for this competency.

The 133 children who read some non-fiction scored higher than others for Mathematics (7 percentage points, p=0.0047), the PAT reading test (5 percentage points, p=0.024), and reading age (around 4 months, p=0.037). There was no difference between the 20 children who read only non-fiction and others. Nor were there any differences marking out the 27 children who reported reading comics (a rather hard-to-believe figure which probably reflects the fact that the question was open-ended), or the 18 who reported reading to younger children.

Letter-Sound Association Knowledge at Age 5

We also looked at whether children's knowledge at age 5 of the associations between sounds and letters continued to be related to differences in children's competencies, as it had at age 5 and 6. We found that it did make a difference for the cognitive competencies.

Table 100

Child knew Certain Sounds Matched Letters at Age 5 and Competencies at Age 8

Knew sounds and letters at age 5 - Competency ↓	Knows sounds and letters n=212	Does not know sounds and letters n=67	Probability
Mathematics	**65.1**	*56.9*	0.0082
PAT reading score	**42.2**	*33.2*	0.0039
Burt word reading test	**48.6**	*42.0*	0.0045
Writing score	**61.8**	*55.9*	0.012
Teacher perception of reading age	**9½-10yrs**	*9-9½yrs*	0.0012
Logical Problem-Solving	**49.2**	*44.2*	0.014
Composite Competency	**65.1**	*61.6*	0.034
Composite Cognitive Competency	**55.5**	*48.6*	0.00074

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Receipt of Daily Newspaper

For the age 6 phase, we made an assumption that daily newspapers provide a window on the world, and bring into the home new knowledge and other lives. We then used receiving a daily newspaper as an indicator of the resources available to children at home, and explored whether this was associated with children's competency levels.

At age 6, children whose home got a daily paper showed higher scores for every competency except Fine Motor Skills—an average gain of 4 percentage points per competency on the composite measure (p = 0.002). Taking family income into account considerably weakened these associations, other than the one with Communication. At age 8, we found indicative associations with Mathematics, writing, and the PAT reading test. Children whose home received a daily paper every day scored 7 percentage points more on Mathematics than those whose homes never saw a daily paper, 6 percentage points more for PAT reading, and 4 percentage points more for writing.

Children who said they read a newspaper or magazine also scored higher than others for 6 competencies, as the next table shows.

Table 101

Reading a Newspaper and Competencies at Age 8

Child reads newspaper→ **Competency↓**	**yes** n=274	**no** n=249	**Probability**
Perseverance	**68.2**	*63.9*	0.021
Individual Responsibility	**68.8**	*65.4*	0.051
Social Skills with Adults	**75.2**	*70.6*	0.0016
Communication	**71.9**	*67.6*	0.0021
Mathematics	**65.2**	*60.6*	0.025
PAT reading score	**41.8**	*37.0*	0.012
Burt word reading test	**48.9**	*45.2*	0.011
Writing score	**62.9**	*58.0*	0.00077
Teacher perception of reading age	**9½-10yrs**	*9-9½yrs*	0.0027
Composite Competency	**65.6**	*62.2*	0.0010
Composite Cognitive Competency	**55.2**	*51.5*	0.0042

The highest scores for each competency are in **bold** type, the lowest in *italics*.

The proportions of children who said they read a newspaper were much the same for all income groups. Taking family income into account maintained all the positive associations between newspaper reading and children's competencies, with the exception of Individual Responsibility. Children in the lowest income group benefited less than others, however. Perhaps this reflects differences in what is read, or differences in the wider context in which any knowledge and awareness gained from newspaper reading is placed.

The proportions of children who said they read a newspaper were much the same across all the groups for maternal qualifications. Taking mother's qualifications into account maintained all the positive associations between newspaper reading and children's competencies. The overall advantage on the Composite Cognitive Competency after taking mother's education into account was 4 percentage points. Reading a newspaper did not increase the scores of children whose mothers had no or school qualifications to the level of those whose mothers had tertiary or university qualifications.

Enjoyment of Reading

There were marked associations between parental assessments of whether their child enjoyed reading, and the children's competency scores.[80] The children who were felt to enjoy reading had higher scores than others, though not significantly higher than the 15 percent whose parents felt their children had mixed feelings about reading, for Logical Problem-Solving and Fine Motor Skills. There were also significant differences between children with mixed feelings about reading and those who did not enjoy it (10 percent) for Mathematics, Literacy, and Logical Problem-Solving.

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[80] The IEA reading study found standard 3 students who thought that the most important ways to become a good reader included "liking it" (as well as "having a lively imagination", and "being able to concentrate well") had higher average scores than those who gave reasons such as 'lots of reading homework", "being told how to do it"
(Caygill 1993, p. 75).

Table 102

Parent View of Child's Enjoyment of Reading and Children's Competencies at Age 8

Parent view of child's enjoyment · Competency↓	Enjoys reading n=395	Sometimes enjoys reading n=76	Does not enjoy reading n=50	Probability
Perseverance	**69.0**	60.1	*53.5*	0.00000014
Individual Responsibility	**69.8**	61.8	*56.0*	0.00000044
Social Skills with Peers	**67.5**	63.0	*61.2*	0.000054
Social Skills with Adults	**74.7**	69.0	*66.2*	0.00020
Communication	**71.2**	67.5	*64.0*	0.0030
Mathematics	**65.9**	59.7	*46.6*	0.000000042
Fine Motor Skills	**84.9**	83.2	*78.8*	0.0035
PAT reading score	**43.5**	31.1	*21.9*	0.00000000000021
Burt word reading test	**50.4**	41.6	*30.5*	0
Writing score	**63.2**	56.1	*46.9*	0.000000000018
Teacher perception of reading age	**9½-10yrs**	8½-9yrs	*8-8½yrs*	0.00000000000000011
Logical Problem-Solving	**47.6**	46.2	*39.5*	0.0020
Composite Competency	**65.9**	60.5	*54.6*	0.0000000000030
Composite Cognitive Competency	**56.0**	49.6	*39.8*	0.000000000000036

The highest scores for each competency are in **bold** type, the lowest in *italics*.

We also asked the parents we interviewed (93 percent of whom were mothers) if they enjoyed reading. No associations were found between parental enjoyment of reading and children's competencies.

Number of Books Read

Children who finished 3 or fewer books in the previous month (on their parents' estimate) scored less than others for Individual Responsibility (5–10 percentage points difference, p=0.0034), Mathematics (7–8 percentage points difference, p=0.014), PAT reading test (7–9 percentage points difference, p=0.0086), Burt word reading test (5–7 percentage points difference, p=0.011), reading age (a 7 to 10 month difference, p=0.00091), and Logical Problem-Solving (7 percentage points difference, p=0.0014). But there were no significant differences between children who finished 6 books, for example, and those who finished more than 14.

Children's Use of Public Libraries

At age 6, we found that children who read library books had higher scores than those who did not. This benefit remained after taking family-income into account, and indeed showed large benefits for children from low income homes, bringing them to the same level as children from the highest income homes. The gains were in Perseverance, Individual Responsibility, Social Skills with Adults, Communication, Fine Motor Skills, and Literacy.

At age 8, the advantages from reading library books at age 6 were visible for every competency.[81]

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[81] The IEA study found that standard 3 and form 4 students who often borrowed library books tended to score more highly for reading (Caygill 1993, p. 86).

Table 103

Reading Library Books at Age 6 and Children's Competencies at Age 8

Child reading library books at age 6 → Competency ↓	Reads library books n=222	Does not read library books n=59	Probability
Curiosity	**63.8**	*59.1*	0.058
Perseverance	**69.4**	*56.5*	0.000028
Individual Responsibility	**70.2**	*57.2*	0.0000063
Social Skills with Peers	**67.1**	*62.6*	0.0069
Social Skills with Adults	**74.1**	*68.3*	0.014
Communication	**71.6**	*65.1*	0.0025
Mathematics	**66.9**	*49.2*	0.000000027
Fine Motor Skills	**85.5**	*82.1*	0.042
PAT Reading score	**43.5**	*27.2*	0.00000040
Burt word reading test	**49.5**	*37.5*	0.00000065
Writing score	**62.6**	*52.0*	0.000016
Teacher perception of reading age	**9½-10yrs**	*8-8½yrs*	0.000000000060
Logical Problem-Solving	**49.0**	*44.7*	0.041
Composite Competency	**66.1**	*57.4*	0.00000020
Composite Cognitive Competency	**56.3**	*44.6*	0.000000015

The highest scores for each competency are in **bold** type, the lowest in *italics*.

At age 8, 83 percent of the children told us they visited the public library. The table below shows some of the same associations as at age 6 (when we used parental reports), and some new ones. The strength of the associations is weaker than with reading library books at age 6, but the size of the differences is sometimes larger.

Table 104

Public Library Use and Children's Competencies at Age 8

Child visits the public library → Competency ↓	Visits public library n=434	Does not visit public library n=69	Probability
Curiosity	**64.0**	*56.7*	0.0010
Social Skills with Adults	**74.1**	*66.5*	0.00065
Communication	**70.9**	*64.5*	0.0011
Mathematics	**65.5**	*51.8*	0.0000035
PAT reading score	**42.2**	*28.4*	0.0000010
Burt word reading test	**48.8**	*39.6*	0.000016
Writing score	**62.1**	*53.5*	0.000075
Teacher perception of reading age	**9½-10yrs**	*9-9½yrs*	0.00035
Logical Problem-Solving	**47.9**	*41.4*	0.0012
Composite Competency	**65.2**	*58.4*	0.0000052
Composite Cognitive Competency	**55.3**	*45.2*	0.000000087

The highest scores for each competency are in **bold** type, the lowest in *italics*.

After allowing for family income at age 8, using a public library continued to make a positive difference for children's scores on Mathematics, Social Skills with Adults, Communication, the Literacy measures, and Logical Problem-Solving. Children from the highest income group who did not use public libraries scored 15 percentage points less for Curiosity. Children from families with incomes of $30,000 or less who used public libraries scored 11 percentage points more on the PAT reading test than their peers who did not use public libraries, and 10 percentage points more on the Composite Cognitive Competency.

Use of public libraries was lower for children whose mothers had no qualifications, or School Certificate or University Entrance only (80 percent compared with 90 percent). After allowing for mother's highest qualification, we found that public library use continued to have a positive association with Curiosity, Social Skills with Adults, Communication, Mathematics, Literacy, and

Logical Problem-Solving. Children who used public libraries had a 10 percentage points' advantage for the Composite Cognitive Competency over those who did not. This advantage almost vanished for children whose mothers had university qualifications, and was slightly less for children whose mothers had tertiary qualifications—or no qualifications at all. The reasons are likely to be different in each case: an already existing abundance of resources and confidence in using them with well-educated mothers, and a scarcity of resources and lack of confidence or knowledge of how best to enjoy and use them among mothers who left school without experiencing success.

Children's Writing Activities

All the writing activities we asked about were positively associated with children's competency scores, with one exception. Children who copied material had lower scores on 5 competencies.

Table 105

Home Writing—Copying and Children's Competencies at Age 8

Home Writing—Copies · **Competency**[1]	**yes** n = 427	**no** n = 94	**Probability**
Communication*	69.2	**73.3**	0.026
Mathematics	61.6	**70.0**	0.0014
Fine Motor Skills	83.5	**86.9**	0.013
PAT reading score	38.2	**46.3**	0.0012
Burt word reading test	46.4	**51.0**	0.014
Logical Problem-Solving	45.7	**50.9**	0.0034
Composite Competency	63.3	**67.1**	0.0040
Composite Cognitive Competency	52.5	**58.1**	0.00087

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Writing stories more than 2 pages long, poems, or reports showed somewhat stronger associations than writing letters, journals, short stories, or plays, or doing word-puzzles or crosswords. But all of these activities appeared to allow children to exercise a range of knowledge, skills, and approaches to life in a way that allowed further development of their competencies.

Some activities showed no associations where one might have expected them. For example, writing letters showed no associations with Communication, or Fine Motor Skills. Curiosity showed positive associations with doing word puzzles or crosswords, and with writing reports, plays or short stories, but not with writing long stories, poems, letters, or journals.

Enjoyment of writing also showed a broad range of associations, with every competency other than Curiosity, Mathematics, and the Literacy measure, PAT reading test. The differences in scores are particularly wide for writing, as one would expect, but also for Perseverance and Individual Responsibility.

There were no significant differences between the children whose parents said they enjoyed writing (64 percent) and those who felt their child had mixed feelings about writing (17 percent) for Perseverance, Social Skills with Adults, Communication, Burt word reading test, reading age, and Fine Motor Skills. There were significant differences between the children who had mixed feelings about writing and those who did not enjoy it (19 percent) for Perseverance, Individual Responsibility, Communication, and Fine Motor Skills.

Table 106

Enjoyment of Writing and Children's Competencies at Age 8

Child enjoys writing activities - Competency ↓	**Enjoys writing activities n=333**	**Sometimes enjoys writing activities n=90**	**Does not enjoy writing activities n=98**	**Probability**
Perseverance	**69.7**	65.6	*55.0*	0.0000000079
Individual Responsibility	**71.2**	66.1	*55.3*	0.0000000000055
Social Skills with Peers	**68.1**	64.4	*61.6*	0.0000046
Social Skills with Adults	**74.9**	71.7	*67.7*	0.00064
Communication	**71.3**	69.9	*65.3*	0.0047
Fine Motor Skills	84.8	**85.2**	*80.5*	0.0043
Burt word reading test	**48.7**	46.1	*43.3*	0.016
Writing score	**63.0**	57.9	*54.9*	0.000038
Teacher perception of reading age	**9½-10yr**	**9½-10yrs**	*9-9½yrs*	0.040
Composite Competency	**65.6**	63.4	*59.3*	0.000010

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Home Mathematics Activities

The specific mathematics activities we asked about at age 8 were:

- can add money correctly
- can use a ruler to measure length or height
- can work out halves and quarters
- plays board games
- plays card games
- plays games on the computer
- can do times tables up to 10
- can tell the time
- can use the telephone
- can use a calculator for simple addition, subtraction
- can use a calculator for simple multiplication, division
- can programme video/microwave

All of these mathematical activities had positive associations for children's competencies apart from playing games on the computer and being able to programme a video or microwave. Only 3 children could not use a telephone, so we did not include this item in our analysis. The mathematical activities which had the strongest associations with children's competency levels were:

- adding money correctly (an overall advantage of 6 percentage points, and 10 percentage points for the Composite Cognitive Competency)
- using halves and quarters (an overall advantage of 8 percentage points, and 8 percentage points for the Composite Cognitive Competency)
- telling the time (an overall advantage of 6 percentage points, and 9 percentage points for the Composite Cognitive Competency).

This fits with our conclusion in the last report that it is the activities which put knowledge and skills to use in practical contexts that are associated with higher scores. These activities also involve several operations. In contrast, while there were positive associations with being able to do times tables up to 10, the overall advantage was 3 percentage points, and 5 percentage points for the Composite Cognitive Competency. The advantage for Mathematics itself was only 6 percentage points, compared with 13 percentage points with telling the time, and 16 percentage points with adding money correctly, and using halves and quarters.

The proportion of children who used halves and quarters was much the same for all income groups. Using halves and quarters continued to make an impact for children's competency levels after taking their family income into account. The percentage points advantage for using halves and quarters was much the same as for family income for Mathematics, Literacy and Logical Problem-Solving; it was greater for Curiosity, Communication, and Fine Motor Skills. Children from the lowest and low income groups who used halves and quarters were able to match the Mathematics scores of children from the highest income group who did not; they scored slightly higher on the PAT reading test, and on the Composite Cognitive Competency.

Using fractions has a marked and very positive association with children's competency levels. This may be because children need to make a fresh assessment of each situation in which they use halves and quarters, which requires - and develops - analytical thinking.

Playing Board Games at Age 6

At age 6, we found that children who played board games, especially those from low income homes, were ahead of others. At age 8, these children were still ahead of others.

Table 107

Board Games Played at Age 6 and Children's Competencies at Age 8

Plays Board Games at 6 → Competency ↓	Plays board games n=250	Does not play board games n=31	Probability
Perseverance	**67.6**	*58.9*	0.031
Mathematics	**65.1**	*47.8*	0.000043
PAT reading score	**41.9**	*25.4*	0.00011
Burt word reading test	**48.0**	*38.8*	0.0038
Writing score	**61.5**	*50.6*	0.00073
Teacher perception of reading age	**9½-10yrs**	*8½-9yrs*	0.0029
Logical Problem-Solving	**48.8**	*42.7*	0.030
Composite Competency	**65.0**	*58.7*	0.0054
Composite Cognitive Competency	**55.2**	*43.3*	0.000017

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Children's Enjoyment of Mathematics

We asked parents whether their children enjoyed 3 aspects of mathematics: using numbers, measuring, and working with patterns.

Children who were reported to enjoy working with numbers scored higher than others for Mathematics, and also for writing and Logical Problem-Solving.

Table 108

Enjoyment of Numbers and Children's Competencies at Age 8

Child enjoys Numbers→ Competency↓	Enjoys numbers n=363	Sometimes enjoys numbers n=83	Does not enjoy numbers n=64	Probability
Mathematics	**65.6**	59.6	*54.4*	0.00040
Writing score	**61.8**	57.7	*57.4*	0.032
Logical Problem-Solving	**48.3**	43.0	*42.5*	0.0013
Composite Competency	**65.0**	62.4	*61.3*	0.022
Composite Cognitive Competency	**55.1**	50.5	*48.6*	0.00058

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Children who enjoyed measuring scored higher for the Burt word reading test (6 percentage points, p=0.006), for writing (6 percentage points, p=0.01), and on the Composite Cognitive Competency (4 percentage points, p=0.032). There was an indicative association showing children who enjoyed patterns scoring 4 percentage points higher than others (p=0.05) for Logical Problem-Solving. Interestingly, there were no positive associations between children's enjoyment of measurement (parent reported), and their performance on the Mathematics competency, though our measure included tasks that involved measurement of pattern dimensions. It is also interesting that children's enjoyment of reading and writing showed more associations with children's competencies than their enjoyment of mathematics did.

Computer Ownership

At age 5, children from homes with a computer scored higher than those from homes without a computer on 6 of the 10 competencies, but when family income was included in the model, only the association with Literacy remained significant. At age 6, however, there were no associations with current computer ownership. Children who had had a computer at age 5 continued to score more highly than others, even if their family no longer had a computer at age 6.

At age 8, current computer ownership did show advantages for children. Seventy-one percent of the study children's families had computers, an increase from the 57 percent of families at age 6.

Table 109

Computer Ownership and Children's Competencies at Age 8

Computer Ownership at 8→ Competency↓	Owns computer n=370	Does not own computer n=149	Probability
Social Skills with Adults	**74.5**	*69.5*	0.0081
Communication	**71.5**	*66.2*	0.0011
Mathematics	**66.5**	*54.8*	0.00000012
PAT reading score	**42.7**	*32.1*	0.00000060
Burt word reading test	**49.3**	*42.1*	0.0000071
Writing score	**62.5**	*56.0*	0.000071
Teacher perception of reading age	**9½-10yrs**	*9-9½yrs*	0.0064
Logical Problem-Solving	**48.6**	*41.8*	0.0000048
Composite Competency	**65.5**	*60.6*	0.000013
Composite Cognitive Competency	**55.9**	*47.5*	0.0000000039

The highest scores for each competency are in **bold** type, the lowest in *italics*.

We also looked at whether children had had access to a computer at home at earlier ages. Children who had had a computer at home at age 5 showed higher scores for Mathematics (9 percentage points, p=0.0004), the PAT reading test (7 percentage points, p=0.006), and Logical Problem-

Solving (7 percentage points, p = 0.0002), with an average overall advantage of 4 percentage points, and 6 percentage points for the Composite Cognitive Competency. The same trend was evident for those who had had a computer at home at age 6, with slightly smaller differences, and the addition of an indicative advantage for Social Skills with Adults (4 percentage points, p = 0.049). The size of these differences was somewhat smaller than those related to current computer ownership. This difference from our age 6 findings may reflect the greater use children can make of computers at age 8, given their higher reading and writing levels.

Computer ownership was 45 percent among families with incomes of less than $30,000, 68 percent among middle income families, and 90 percent among high income families. After taking family income into account, computer ownership showed no advantage for Social Skills with Adults or reading age, and its association with Communication was weakened. However, it continued to show significant associations with Mathematics, the other Literacy measures, and Logical Problem-Solving. It was more important than family income for writing and Logical Problem-Solving scores.

Children in the lowest income group showed most benefit from computer ownership, scoring on average for the Composite Cognitive Competency 10 percentage points more than their peers without a computer, compared with 4 percentage points advantage for children in the highest income group with a computer.

In terms of mother's education, computer ownership ranged from 41 percent for those without any qualification, and around 75 percent for mothers with mid-school to tertiary qualifications, to 90 percent for those with university degrees. After taking mother's education into account, computer ownership no longer showed associations with Social Skills with Adults or with reading age. The strength of the associations with Communication and writing was reduced. Computer ownership continued to show strong associations with Mathematics, PAT reading test, the Burt test, and Logical Problem-Solving. Children who showed the most benefit from family computer ownership for the Composite Cognitive Competency were those whose mothers had a tertiary qualification, 8 percentage points, and those whose mothers had a mid-school to tertiary qualification, 5-6 percentage points.

Children's Computer Use

In this phase, we asked children what they actually did on the computer. Looking only at the children who reported using a computer, we found no associations with the use of the computer to play games, to do homework or projects, or to play educational games. [82]

Children who used CD-roms to access information showed slightly higher scores on 8 competencies than those who used graphics packages, a computer use which had positive associations with 5 competencies, or who did word processing, which showed positive associations with 7 competencies. Children who used CD-roms scored better for Curiosity (7 percentage points, p = 0.006), children drawing or using graphics packages had higher scores on Fine Motor Skills (4 percentage points, p = 0.004), and children who used the computer for word processing had higher scores for writing (5 percentage points, p = 0.01).

Using the family computer for word processing occurred at much the same rate for all income groups. When we allowed for family income, we found that word processing continued to offer advantages, other than for children in the lowest and middle income groups. Children in the top income group showed higher scores for Perseverance and Individual Responsibility if they did word processing on the computer. Those who gained most from word processing on the family computer were the children in the low income group, who scored 29 percentage points more for Perseverance and Mathematics, 30 percentage points more for Individual Responsibility, and 21 percentage points more for the PAT reading test. This may reflect the small number of children in this category (10). But this group also had more children using graphics packages on their computer, and this use was also positive for children's competency levels. Children in this group had the highest average score for the Composite Competency.

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[82] Only a few children used the computer to write programmes, to send e-mail or faxes, or for desktop publishing, so we did not analyse these activities.

Using the family computer for word processing also occurred at much the same rate for children whose mothers had different levels of qualifications. Allowing for mother's education left the positive associations between children's competencies and word processing intact. The two groups of children who appeared to benefit most were those whose mothers' highest qualification was mid-school, and those whose mothers had a tertiary qualification.

Using graphics packages on the computer continued to show benefits for competencies other than writing after we took family income into account. Children with family incomes of less than $60,000 who used graphics packages were particularly advantaged, showing scores as high as those of children in the top income group who used graphics packages.

Children whose mothers had no school qualification were less likely to use graphics packages: only 11 percent did so, compared with 25 percent overall. The highest users were children whose mothers had trade qualifications or university degrees. Once we took mother's qualification into account, the positive associations between children's use of graphics and Communication, Mathematics, and writing were no longer evident. The positive associations with the other Literacy measures and Logical Problem-Solving remained. Mother's education had a stronger association than using computer graphics. But this use of the computer remained beneficial, particularly for children whose mothers had no school qualification, who scored 19 percentage points more than their peers, and children whose mothers had a tertiary qualification, who scored 11 percentage points more than their peers.

Television Watching

At age 5, children who watched a lot of television (more than 4 hours a day) scored less for Mathematics; at age 6, there were no clear associations between children's television watching and their competency levels. At age 8, however, we found consistent patterns for 7 competencies. Children who watched one hour or less a day on average scored higher than others.[83]

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[83] The IEA Reading study found that students who spent more hours watching television scored lower than others on reading, and noted a similar finding in the 1987 IEA study of writing (Caygill 1993, p. 69).

Table 110

Daily TV Watching and Children's Competencies at Age 8

Child's Daily TV watching at age 8→ Competency[1]	≤1 hr (incl.0) n=203	>1 hour n=312	Probability
Perseverance	**68.7**	*64.7*	0.036
Social Skills with Peers	**67.8**	*65.2*	0.013
Communication	**72.0**	*68.5*	0.025
Mathematics	**68.7**	*59.6*	0.000012
Fine Motor Skills	**85.6**	*83.2*	0.027
PAT reading score	**44.4**	*36.3*	0.000039
Burt word reading test	**50.5**	*45.0*	0.00023
Writing score	**63.9**	*58.4*	0.00027
Teacher perception of reading age	9½-10yrs	*9-9½yrs*	0.000091
Logical Problem-Solving	**48.4**	*45.4*	0.027
Composite Competency	**66.4**	*62.4*	0.00018
Composite Cognitive Competency	**57.1**	*51.1*	0.0000050

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Children from the highest income group were most likely to watch an hour or less of television a day (47 percent compared with 35 percent for others). Allowing for family income left no association between television watching amount and Perseverance, Social Skills with Peers, and Communication. The associations with Mathematics and the Literacy measures remained.

Some interesting differences between income groups were evident. The scores of children in the mid and high income groups for Individual Responsibility were unaffected by their television watching. The highest scores for children in the lowest income group were for those who watched 1–2 hours, and for the low income group, those who watched more than 2 hours. Yet for Social Skills with Adults, and the PAT reading test, low income children who watched less than 1 hour scored higher than their peers who watched more television.

Unlike activities such as public library use, computer ownership, and using halves and fractions, watching less than an hour of television a day did not lift lowest or low income children's scores to the level of high income children's scores, with one exception. Boys in the low income group who watched less than an hour of television had the highest PAT reading scores for all boys.

We also found that earlier television watching habits did have an impact over time. At age 8, children who had watched television for more than 3 hours a day at age 5 had lower scores for Mathematics (19 percentage points difference less than those who watched none, and 12 percentage points less than those who watched up to 2 hours a day, p=0.009). They also had lower scores for Literacy (again, 19 percentage points less than those who watched none, and 10–13 percentage points less than those who watched up to 2 hours a day for the PAT reading test, 9 percentage points on the Burt word reading test, 13 and 8 percentage points on the writing test. Children who had watched more than 3 hours a day at age 5 were at least 12 months behind other children in reading age at age 8.

Table 111

Children's Daily TV Watching at Age 5 and Competencies at Age 8

Child's daily TV watching at age 5 · Competency ↓	none n=14	≤1 hr n=76	1-2 hrs n=97	2-3 hrs n=47	>3hrs n=44	Probability
Communication	66.9	70.9	73.7	67.3	*65.2*	0.028
Mathematics	**72.5**	65.9	65.4	61.0	*53.5*	0.0089
PAT reading score	**49.5**	43.6	40.9	38.0	*30.3*	0.0089
Burt word reading test	**49.2**	49.1	49.1	44.0	*40.1*	0.014
Writing score	**66.4**	61.2	61.9	59.5	*53.4*	0.034
Teacher perception of reading age	10-10½yr	9½-10	9½-10	9-9½	*8½-9yrs*	0.00098
Composite Competency	**66.6**	65.4	66.0	62.6	*59.3*	0.014
Composite Cognitive Competency	**60.4**	55.9	55.1	52.4	*46.7*	0.0025

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Television watching at age 6 also showed new associations at age 8, but not so strongly. There were differences emerging, however, between those who had watched television for an hour or less at age 6, and those who watched it for more.

Table 112

Children's Daily TV Watching at Age 6 and Competencies at Age 8

Child's daily TV watching at age 6 · Competency ↓	none n=24	≤1 hr n=120	1-2 hrs n=89	2-3 hrs n=33	>3hrs n=15	Probability
Mathematics	64.4	**65.2**	**65.2**	54.5	*52.7*	0.037
PAT reading score	**45.7**	43.8	37.9	33.8	*27.4*	0.011
Burt word reading test	**51.1**	48.9	46.4	42.3	*38.3*	0.040
Teacher perception of reading age	10-10½	9½-10	9½-10	9-9½	*8½-9yrs*	0.0018
Logical Problem-Solving	**50.6**	49.1	49.1	44.2	*39.0*	0.042
Composite Cognitive Competency	**56.5**	55.6	54.5	47.6	*45.6*	0.0098

The highest scores for each competency are in **bold** type, the lowest in *italics*.

In looking at television watching in terms of time only, it is possible that the association is not with the way that time is spent, i.e. with television per se, but the time that becomes unavailable for other activities. But television by its very nature also absorbs time very easily.

At age 8 we tried to delve further into the content of children's television viewing, by asking children what their favourite programmes were. There were no differences related to children's preference for cartoons or children's television. Children who mentioned news or documentaries scored higher on Curiosity by 7 percentage points (p=0.022). Children who mentioned adult programmes (including drama, situation comedies) scored higher on Communication by 4 percentage points (p=0.02), and on Mathematics by 5 percentage points (p=0.03). Only 10 children mentioned adult movies or videos, and they scored higher for Curiosity (11 percentage points, p=0.05), and the Burt word reading test (11 percentage points, p=0.05). The 13 children who had no favourite television programmes also scored higher than others on 5 competencies, with an overall advantage of 7 percentage points, and 11 percentage points for the Composite Cognitive Competency. Children who did not mention sports programmes scored 6 percentage points more for Fine Motor Skills (p=0.02).

Parental Television Watching

The higher the family income, the less television was watched by parents (47 percent of the high income parents watched an hour or less a day on average, compared with 32 percent of the lowest income parents). After taking family income into account, the associations with Mathematics,

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Fine Motor Skills, and the PAT reading test remained, but not those with the Burt test or writing. Children in the low-mid family income groups whose parents watched less than an hour of television a day scored higher for Mathematics and Logical Problem-Solving. Those in the low income group had an advantage of 17 percentage points over their peers whose parents watched more television, bringing them to the level of the highest income children for these 2 competencies.

Lessons Outside School

There were positive associations between having lessons outside school and children's competencies, but not Curiosity or Perseverance. Differences also existed in relation to the kind of lessons. There were no positive associations with cultural or ethnic lessons, and one negative association each for the 5 children having church-related lessons (a difference of 13 percentage points for Social Skills with Peers, p=0.028), and the 22 children having academic lessons (a difference of 9 percentage points for Perseverance, p=0.05). When we looked at children's scores in terms of the teacher's rating of the child's overall progress, we found no difference between the children who had academic lessons, and those who did not.

Children taking sports lessons scored higher for Social Skills with Peers (3 percentage points, p=0.009), Mathematics (6 percentage points, p=0.01), the PAT reading test (7 percentage points, p=0.003), Logical Problem-Solving (4 percentage points, p=0.008), and reading age (4 months, p=0.05).

Children taking arts lessons showed the most positive associations.

Table 113

Arts Lessons Outside School and Children's Competencies at Age 8

Child has lessons outside school—Arts → **Competency ↓**	yes n=147	no n=374	**Probability**
Perseverance	**70.5**	*64.6*	0.0042
Individual Responsibility	**72.7**	*65.2*	0.000083
Social Skills with Peers	**70.0**	*64.8*	0.0000049
Social Skills with Adults	**76.4**	*71.7*	0.0036
Communication	**73.9**	*68.4*	0.00023
Mathematics	**70.8**	*60.1*	0.0000017
Fine Motor Skills	**87.6**	*82.7*	0.000014
PAT reading score	**47.3**	*36.6*	0.00000066
Burt word reading test	**53.3**	*44.8*	0.000000097
Writing score	**65.7**	*58.6*	0.000012
Teacher perception of reading age	**9-9½yrs**	*8½-9yrs*	0.00054
Logical Problem-Solving	**51.6**	*44.7*	0.0000031
Composite Competency	**68.5**	*62.3*	0.000000029
Composite Cognitive Competency	**59.6**	*51.1*	0.0000000020

The highest scores for each competency are in **bold** type, the lowest in *italics*.

Musical Experience

Children who played musical instruments or sang in choirs showed higher scores for all the competencies bar Curiosity.

Table 114

Playing of Musical Instrument or Musical Group Participation and Children's Competencies at Age 8

Music - Competency ↓	yes n=206	no n=315	Probability
Perseverance	**68.9**	*64.5*	0.022
Individual Responsibility	**70.8**	*65.0*	0.00085
Social Skills with Peers	**68.3**	*64.9*	0.00081
Social Skills with Adults	**75.4**	*71.5*	0.0029
Communication	**72.6**	*68.2*	0.00059
Mathematics	**67.5**	*60.3*	0.00053
Fine Motor Skills	**86.5**	*82.5*	0.00018
PAT reading score	**43.5**	*37.1*	0.0012
Burt word reading test	**49.7**	*45.6*	0.0063
Writing score	**64.9**	*57.8*	0.0000022
Teacher perception of reading age	**8½-9yrs**	*9-9½yrs*	0.016
Logical Problem-Solving	**49.5**	*44.7*	0.00057
Composite Competency	**66.7**	*62.3*	0.000018
Composite Cognitive Competency	**57.1**	*51.1*	0.0000055

The highest scores for each competency are in **bold** type, the lowest in *italics*.

The proportion of children who played a musical instrument or sang in choirs was much the same for the lowest to middle income groups, and slightly higher for those in the highest income group. After taking family income into account, the positive associations of this activity continued for all competencies bar Perseverance and reading age. The children who benefited most were those in the middle and high income groups.

The proportion of children who played a musical instrument or sang in choirs increased with the level of mother's education, from 30 percent of children whose mothers had no qualification, to 54 percent of those whose mothers had a university degree. After taking mother's qualification into account, this activity remained positively associated, though somewhat diluted, with Fine Motor Skills, writing, Logical Problem-Solving, Individual Responsibility, and Social Skills with Peers. It was no longer associated with Perseverance, Social Skills with Adults, Mathematics, and the other 3 Literacy measures. The children who benefited most from musical activity were those whose mothers' highest qualification was a school one.

Children's Membership of Clubs and Organizations

There were no associations with club or organization membership per se. Children who belonged to arts or performing arts clubs did better than other children for Mathematics and Individual Responsibility (9 percentage points more each), writing (6 percentage points more), Logical Problem-Solving, Communication, Social Skills with Adults, and Social Skills with Peers (5 percentage points more each). Children who were members of organizations such as Keas and Brownies scored higher for Mathematics (6 percentage points more), PAT reading comprehension (5 percentage points more), writing and Social Skills with Adults (4 percentage points more each), and Communication (3 percentage points more).

Children who belonged to a sports club scored higher for Curiosity (5 percentage points) and Logical Problem-Solving (3 percentage points), but 3 percentage points lower on the Burt word reading test. This is likely to reflect the much higher proportion of boys who belonged to sports clubs.

There were no differences related to cultural or church clubs.

Parental Membership of Organizations

We found very few associations between children's competency levels and their parents' membership of organizations. Children whose main caregiver[84] belonged to one or more organizations scored slightly higher for Mathematics (4 percentage points, $p = 0.05$), and Logical Problem-Solving (4 percentage points, $p = 0.01$).

Parental membership of particular kinds of organization showed a few associations, often only one in relation to each kind. There were advantages for children whose main caregiver belonged to a performing arts organization ($n = 20$), for Individual Responsibility, Mathematics, Fine Motor Skills, the Literacy measures other than the Burt word reading test, and Logical Problem-Solving.

We also looked at partner's membership of organizations: partners were predominantly male. We found that their membership of some organization showed positive associations for children's Curiosity (5 percentage points, $p = 0.006$), Communication (3.5 percentage points, $p = 0.03$), and Logical Problem-Solving (4 percentage points, $p = 0.013$). Here the advantage came from membership of sports clubs, for Curiosity, Communication, Mathematics, and Logical Problem-Solving, or membership of professional organizations ($n = 20$), for Curiosity, Perseverance, Individual Responsibility, Social Skills with Peers, Social Skills with Adults, and Communication.

Summary

The impact of home activities on children's competencies was seen in differences between children's scores which ranged from 2 to 22 percentage points. Most of the differences in children's scores were moderate to modest. With Perseverance, Individual Responsibility and the Literacy measure, Burt word recognition, the impacts tended towards the moderate end; with Mathematics and the PAT reading comprehension test, they were strong.

A considerable number of the home experiences we asked about showed different patterns related to family income or mother's education. Children in low income homes, whose mothers experienced little school success, often have fewer experiences than others. But they also share in quite a range of those experiences, and enjoy their benefits. Activities such as reading the newspaper, using a computer, particularly graphics packages, using a public library, and using mathematics in daily life benefit children irrespective of family income, but they particularly benefit those from low income homes.

The pattern is less clear in relation to mother's education. Public library and computer use do not benefit children whose mothers have no or only school qualifications. Does this reflect patterns of parental use of these resources, or parental confidence? For children to benefit in terms of the competencies we measured, parental education matters, not just the material resource. Perhaps this underlines further the importance of involving parents with little education *in* education, with a joint focus on child and parent alike.

Children's competency levels also reflected some parental activities, particularly the amount of time they watched television. Again, is this because there is less time available for parents to spend with their children, or is it that the television watched does not extend the parents' own experience? Parental membership of organizations, an indicator of "social capital", shows few associations, though those that exist—performing arts for mothers, sports for men—are interesting.

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[84] The parental respondent for our interview: predominantly mothers (7 percent were fathers).

CHAPTER 12

WHICH FACTORS HAVE MOST BEARING ON CHILDREN'S COMPETENCIES?

Which are the factors in children's lives and experience which show the strongest relationships with children's competencies, and which are related to large differences[85] in children's scores?

We start this chapter with the key factors (of those we studied) which regression analysis finds to be the main predictors of the study children's scores. Family socioeconomic factors, such as income, education, and occupation, feature prominently. We then move to summarise the activity or experiential factors which make large differences to children's scores.

Key Factors in Predicting Children's Competencies

In our one-factor analyses of the factors showing associations with children's competencies, we found different sets of factors associated with each competency, but some common patterns. Where there are very large impacts (a difference of at least 18 percentage points between the highest and lowest scores) or large impacts (a difference of 10 to 18 percentage points between the highest and lowest scores), these factors appeared most frequently (negative factors are followed by a minus sign):[86]

family income
maternal education
school socioeconomic composition
school decile
parental occupations at child's birth
child's school attendance
gender
enjoyment of reading
enjoyment of writing
use of public library
writing restricted to copying (-)[87]
reads only homework books (-)
English is the child's second language (-)
higher amount of television watched by child at age 5(-)
higher amount of television watched by parents(-).

Some of these factors are inter-related, most obviously maternal education, parental occupations, and family income. School socioeconomic composition and school decile cover much the same ground.

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[85] Of 10 percentage points or more.

[86] We omit teacher and parent views of children's progress, which are more likely to reflect children's progress, rather than contributing to it—though these views themselves may then foster or hinder adult support and encouragement for children.

[87] (-) refers to a negative relationship, i.e. the factor is associated with lower performance in a given competency.

To exclude overlapping factors, we used stepwise regression.[88] We included in this analysis the factors which had been identified in our one-factor analysis of variance as having the largest associations with children's competency levels (see Appendix 2), for the set of competencies we identified (see Chapter 2) as providing the best indication of children's overall competency levels at age 8.

This set of competencies is Mathematics, Literacy (using the PAT reading comprehension test), Perseverance, Communication, and Individual Responsibility.

"Key" factors in relation to "key competencies"

The factors which these analyses yield as key indicative factors for scores in more than one competency measure are:

factor	*competency*
family income	Mathematics, Literacy, Perseverance, Communication
paternal occupation	Mathematics, Individual Responsibility, Perseverance, Communication
maternal education	Mathematics, Literacy
school socioeconomic composition/decile	Mathematics, Literacy
English is child's second language	Mathematics, Individual Responsibility
child enjoys reading	Mathematics, Literacy, Individual Responsibility
child enjoys writing	Individual Responsibility, Perseverance

As noted earlier, all but 2 of these factors are related to children's family characteristics.[89] However, there was a low correlation between these socioeconomic characteristics and children's enjoyment of reading and their enjoyment of writing.[90] We cannot tell from statistical analysis alone whether this enjoyment precedes the development of capacity in competencies, or follows. Something in between—a spiralling relationship between effort and enjoyment—seems most likely. Looking for reading materials which children enjoy, and themes they can tackle in their writing, are unlikely to go amiss in the work of helping children develop their capability to the full.

Other Factors Which are Likely to Make a Difference for Children

The key indicative factors identified above are not the only factors which emerge in our study as capable of improving children's competencies, and closing performance gaps between different groups of children. The next section summarises activity or experiential factors which showed strong associations with scores on the set of key competencies (Mathematics, Literacy—PAT reading comprehension, Perseverance, Communication, and Individual Responsibility). Large differences in children's scores were associated with differences in their experience of, or possession of, a given factor.[91] Some of these factors are more likely to occur within well-resourced families— hence the ability of socioeconomic factors such as family income, paternal occupation, and maternal education to act as key predictors. But they cannot be reduced to socioeconomic factors alone.[92]

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[88] This provides a mechanism for selecting a subset of the factors in which, after the initial selection of factor, each subsequent factor will be the one which overlaps least with what preceded it, among the factors included in the regression. Statistical software packages sift through all the possibilities from the set of factors provided, and then select factors in order of the size of the contribution they make to the ability to predict children's scores, with the factor making the largest contribution being selected first.

[89] Table 38, p. 77 shows the marked association between family income and school decile. The correlation between family income at age 8 and school decile was r=0.32.

[90] As reported by parents.

The full tables showing significant associations between factors and the competencies, by their strength and the size of the difference that they make, are given in Appendix 2.

Literacy—PAT reading comprehension test

The one-factor analyses indicate four areas of interest in terms of pragmatic action to improve children's competency levels in reading:

- The actual practice of reading, offering diversity through the range of books available in libraries, and enjoyment through the selection of relevant material—relevant not only in terms of subject matter, but pitched at a level that challenges rather than defeats (the factor: child's rating of difficulty of classroom work). Assigned homework reading may be too easy, too hard, or not relevant to the child's interests. Similarly, limiting writing activity to copying narrows the experience.
- Mathematical experiences such as playing board games, telling the time, and using fractions (halves and quarters) may help children's reading comprehension ability by giving them confidence in thinking in terms of structure, through activities which apply knowledge in an enjoyable way. Games challenge children to think and understand. The structures a child needs to recognise in numbers are simpler than those needed for reading, and can thus provide a useful foundation.
- The amount of TV watched by children at ages 5, 6 and 8, and the amount of TV watched by their parents, has a negative impact on children's reading, with larger impacts from earlier TV watching. Few children who watched high amounts of TV at age 5 were watching less at age 8, suggesting that patterns of TV watching can be hard to alter once fixed at an early age. As noted earlier, we cannot tell from this study whether it is the content of TV itself that is inimical to children's development of reading, or the amount of time it absorbs, at the cost of practising other activities which are more conducive to children's competency development.
- High ratings in these aspects of ECE quality can make a difference for children's reading at age 8:

  a print saturated environment

staff who are responsive to children

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[91] These associations have been identified in one-factor analyses, which include all children; this is one advantage over stepwise regression and the subsequent analysis of variance, when the analysis is limited to the children with no missing data in all the factors included in the regression analysis. This limitation may therefore introduce some bias into the stepwise regression analysis.

[92] An indication of this comes from the minimal correlations between activities and family income at age 8. For example, these range from r=-0.01 to r=-0.16 between family income at age 8 and these activities: school attendance, use of public library, copying the only form of writing practised by the child at home, only homework books read at home, and amount of television watched.

high levels of staff:child interaction
staff who model and guide children through ECE activities
staff who join children in their play.

Mathematics

The factors which appear to make a difference for children's Mathematics scores are similar to those which make the most positive differences for their reading:

- the amount of TV watching at earlier and current ages, and parental TV watching
- enjoyment of reading, use of library previously and currently, reading more than homework books, and doing other writing than copying
- enjoyment of numbers, playing board games, using fractions (halves and quarters), telling the time, and adding money
- of the ECE quality factors, the most important are that staff are responsive to children, and join in their play
- the longer a child's experience of ECE, the better
- in terms of school, low turnover of fellow students in the class, a low level of perceived work difficulty, and a low level of class cohesiveness (meaning that not every child needs to feel that he or she has to like or be like everyone else in the class).

Perseverance

There are fewer factors which show large associations with Perseverance. They include some of those which make a large positive difference for Literacy and Mathematics:

- enjoyment of reading, reading more than homework books, using the public library, doing writing other than copying, and playing board games.

The factors which are more particular to making a positive difference for Perseverance levels are:

- enjoyment of writing, good school attendance, class size of less than 21, and
- a high degree of being able to complete activities at the child's last ECE.

Individual Responsibility

The mixture of factors which make a large difference for Individual Responsibility is small, and has most in common with those which make a difference for Perseverance:

- enjoyment of reading, using the public library, doing writing other than copying, and playing board games;
- enjoyment of writing, good school attendance.

Communication

The only experiential or activity-based factor to feature strongly and largely in association with Communication was having good school attendance.

Interestingly, the amount of television watched is not so relevant for the Perseverance, Individual Responsibility and Communication competencies as it was for children's level of Literacy and Mathematics.

CHAPTER 13

CONCLUSION

We have seen that children's competency levels at age 8 reflect their family resources, past as well as current, their previous experiences, and current activities. The main factors we found when we looked at children's competencies at age 5 and age 6 are still evident. Three years after the study children finished early childhood education, we observe no diminishment of the contribution made to their competency levels by early childhood education factors: in fact some factors appeared to be growing in strength as the children grew older, particularly the length of their ECE experience, and also the quality indicators of their ECE experience related to teaching processes appropriate to this age-group,[93] and exposure to print.

Our material on the differences between families in terms of the resources they can offer children, both material and intangible, is consistent with the research showing a divide between the "work-rich" and "work-poor" (Callister 1998); and between families whose parents have marketable qualifications giving them entry to skilled or professional work, and those who can access only unskilled, insecure work. Family income and maternal qualifications are the key family resource factors differentiating children. Contrary to persistent stereotypes of sole parents, sole parentage is not a key factor.

Families on low incomes are the families which are often paying a greater proportion of their income on housing than others, leaving even less to spend on children. Without state support for those in such poorly paying jobs, and for those who cannot find work, the gaps in experiences and resources which can be seen for children in low income families could be insurmountable. As it is, children from these homes have major obstacles to climb over or thread their way through to join their more advantaged peers. What we have said in our earlier reports about the need to support children adequately through ensuring sufficiently paid work, accessible family support, and affordable housing of good standard can only be reiterated.

Children from homes with low incomes and low maternal qualifications, and Maori children have more difficulty than other children retaining to age 8 the progress they make between age 5 and 6. This finding provides support for initiatives to bring parents of these children into joint learning with their children, and to use schools as fields for adult education.[94] It also supports the need to ensure that public libraries remain free and accessible to children and their families, and raises the question of what further support libraries could be giving to parents to give them the knowledge and confidence to support their children which are available in more advantaged homes.

The correlation of age 8 competency levels with age 6 levels is higher than the correlation between age 5 and age 6 levels. We also see a convergence of performance in Literacy and Mathematics with performance in Perseverance, Individual Responsibility, and Communication.

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[93] Marcon (1999) found that 4 year old U.S. Headstart children who had experienced a developmentally appropriate programme demonstrated greater mastery of basic skills than those who had more didactic programmes, or those who experienced mixed programmes.

[94] A similar conclusion is reached by Lee and Croninger (1994) in their analysis of the role of school and home on U.S. eighth-graders' reading achievement. Home support and interest in education benefits individual children; it also benefits the schools those children attend.

This convergence was not evident at age 5 or age 6.This suggests that these are the competency dimensions which would benefit from earlier attention at home, in early childhood education centres, and in the first few years of school.

Our material on home activities continues to show the value of putting knowledge and skills to use (e.g. using fractions in everyday life), to serve a purpose (e.g. counting money to see if one has enough to buy the latest Goosebumps), to interact with others (e.g. board and card games), or simply to enjoy. Writing is one of the more daunting aspects of beginning school, but its continual practice in a variety of forms, for different purposes, seems particularly to extend children's competencies. Television is less useful to children than other ways in which they can spend their time.

There are doubtless other factors relating to children's competencies which our study did not include, or which elude inclusion in a quantitative study such as this. As we analyse the material we do have, we become more and more conscious of the impossibility of ever defining all the ingredients or processes which go to make competent children, and competent adults. Research in this area cannot be experimental; it cannot randomly engage some children in some experiences while consciously withholding them from other children. Our experiences form us: they are not simply interventions, or injections against a disease, injections with reasonably predictable outcomes.

What this study can do is point to the experiences, resources, and activities which seem to make a difference for children, and to explore the connections between them. It can also point to areas which merit a closer exploration, particularly the qualitative case-study work which can improve our understanding of the dynamics of processes over time. Three prime examples come to mind:

- We found Māori children, children whose mothers had little formal education, and children from low income homes making rapid progress in their first year of school but then dropping back in far greater proportions than children from more advantaged homes. What is happening for these children in classrooms? At home? In the intersections between home and school? What can we do to change this pattern?
- We found that boys are less predictable in their progress than girls between the ages of 5 and 8. Is this pattern simply due to the school environment? Would we find different patterns for boys who were home schooled? Or is it due to differences in boys'ability to manage for themselves, to persist, to listen, respond, and communicate through words—differences which may be due to different social and familial expectations of boys and girls from birth onwards, and different tolerances? Is this pattern able to be altered?
- The competencies of Persistence and Individual Responsibility are becoming increasingly key in children's performance. How do these competencies develop and strengthen before children reach school, and in their first year of school? To what extent do these competencies depend on the structures and processes of children's educational experiences?

As this report goes to print, we are back with the study children as they turn 10, and with their parents and teachers. We look forward to reporting on their progess since we last saw them, and on presenting that progress within the rich and complex context of their lives.

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APPENDIX 1

Table 1

Correlations between pairs of derived Competency measures at age 8

(n = 521) (highest r in each column **bolded**)

	Curiosity	Perseverance	Individual Responsibility
Curiosity	1.00	0.46	0.31
Perseverance	0.46	1.00	**0.80**
Individual Responsibility	0.31	**0.80**	1.00
Social Skills with Peers	0.17	0.53	0.62
Social Skills with Adults	0.47	0.56	0.61
Communication	**0.54**	0.65	0.67
Mathematics	0.22	0.45	0.41
Fine Motor Skills	*0.08*	0.29	0.21
PAT Reading Score	0.20	0.41	0.40
Burt Word Reading Test	0.15	0.34	0.34
Writing score	0.21	0.41	0.39
Teacher Perception of Reading age	0.24	0.44	0.39
Logical Problem Solving	0.15	0.32	0.27

	Social Skills with Peers	Social Skills with Adults	Communication
Curiosity	0.17	0.47	0.54
Perseverance	0.53	0.56	0.65
Individual Responsibility	**0.62**	0.61	0.67
Social Skills with Peers	1.00	0.46	0.44
Social Skills with Adults	0.46	1.00	**0.70**
Communication	0.44	**0.70**	1.00
Mathematics	0.31	0.31	0.45
Fine Motor Skills	0.19	0.10	0.23
PAT Reading Score	0.30	0.31	0.42
Burt Word Reading Test	0.28	0.27	0.41
Writing score	0.29	0.29	0.42
Teacher Perception of Reading age	0.30	0.28	0.46
Logical Problem Solving	0.20	0.17	0.34

	Mathematics	Fine Motor Skills	PAT Reading Score	Burt Word Reading Test
Curiosity	0.22	*0.08*	0.20	0.15
Perseverance	0.45	0.29	0.41	0.34
Individual Responsibility	0.41	0.21	0.40	0.34
Social Skills with Peers	0.31	0.19	0.30	0.28
Social Skills with Adults	0.31	0.10	0.31	0.27
Communication	0.45	0.23	0.42	0.41
Mathematics	1.00	**0.37**	0.61	0.60
Fine Motor Skills	0.37	1.00	0.32	0.29
PAT Reading Score	**0.61**	0.32	1.00	0.72
Burt Word Reading Test	0.60	0.29	**0.72**	1.00
Writing score	0.51	0.30	0.48	0.58
Teacher Perception of Reading age	0.53	0.23	0.65	**0.73**
Logical Problem Solving	0.59	0.33	0.50	0.43

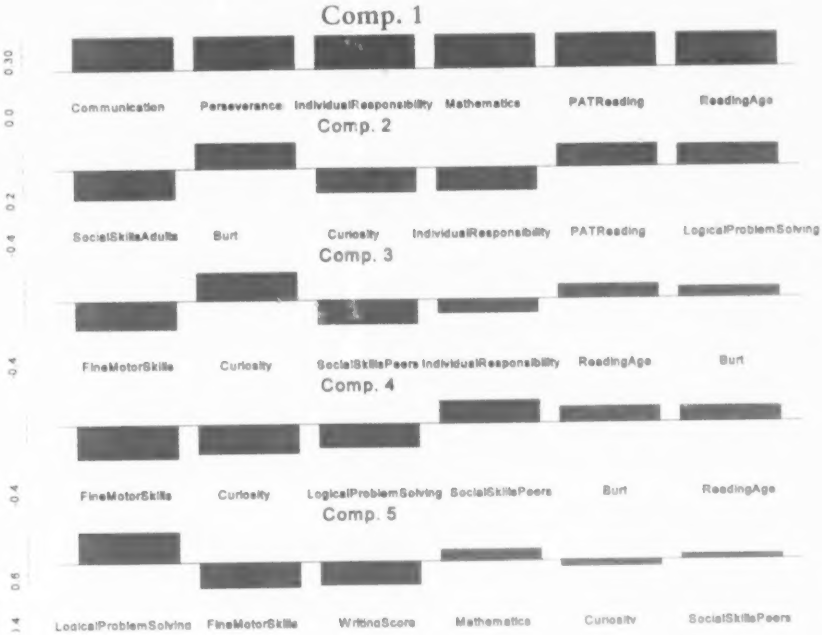
	Writing Score	Teacher Perception of Reading age	Logical Problem Solving
Curiosity	0.21	0.24	0.15
Perseverance	0.41	0.44	0.32
Individual Responsibility	0.39	0.39	0.27
Social Skills with Peers	0.29	0.30	0.20
Social Skills with Adults	0.29	0.28	0.17
Communication	0.42	0.46	0.34
Mathematics	0.51	0.53	**0.59**
Fine Motor Skills	0.30	0.23	0.33
PAT Reading Score	0.48	0.65	0.50
Burt Word Reading Test	**0.58**	**0.73**	0.43
Writing score	1.00	0.51	0.32
Teacher Perception of Reading age	0.51	1.00	0.40
Logical Problem Solving	0.32	0.40	1.00

Principal Components Analysis

The first component had changed a little in composition since age 6, now comprising in largest measure approximately equal proportions of Communication. Perseverance, Individual Responsibility, Mathematics, PAT reading score, Teacher's Perception of reading age and Burt word reading test. Coming in a bit behind these is the writing score. This component accounted for 45 percent of the variance. What this suggests is that it is these competencies which make the biggest contribution to explaining the structure we are seeing in the data with respect to an individual's performance.

As before the second component separates out the 6 "social competencies" (as in table 2.112) from the others, although writing score and Fine Motor Skills are at a weaker level of contribution than the reading scores, Logical Problem Solving and Mathematics. These first two components account for 59 percent of the variance.

The loadings are shown graphically below:



Factor Analysis

Table 2

Uniqueness of the Competency Measures at age 8

Competency	Uniqueness age 8
Fine Motor Skills	**0.82**
Logical Problem Solving	0.65
Writing score	0.57
Social Skills with Peers	0.54
Curiosity	0.49
Teacher perception of reading age	0.41
Mathematics	0.40
Social Skills with Adults	0.39
PAT reading score	0.33
Perseverance	*0.29*
Burt word reading test	*0.27*
Communication	*0.23*
Individual Responsibility	*0.13*

Table 3

Uniqueness of the Competency Measures at age 6

Competency	Uniqueness age 6
Fine Motor Skills	**0.89**
Logical Problem Solving	0.77
Social Skills with Peers	0.60
Invented Spelling	0.41
Word Reading	0.40
Number Knowledge	0.38
Perseverance	0.37
Inquisitiveness	0.36
Social Skills with Adults	0.29
Independence	*0.27*
Communication	*0.17*

Table 4

Uniqueness of the Competency Measures at age 5

Competency	Uniqueness age 5
Motor Skills	**0.77**
Logical Reasoning	0.67
Perseverance	0.64
Social Skills with Peers	0.63
Inquisitiveness	0.56
Early Literacy	0.43
Independence	0.41
Early Number Knowledge	0.37
Communication	0.29
Social Skills with Adults	0.27

Table 5

Predictability Indices for the Capacity of each of the age 5 Competencies to act as a Precursor for Age 8 Competency Performance

Age 8 → Age 5 ↓	Cur	Per	Ind.Res	SSP	SSA	Com	Maths	FMS	PAT	Burt	Write	Read Age	LPS
Curiosity	*0.21*	0.14	0.05	0.00	0.14	0.26	0.17	0.22	0.08	0.07	0.05	0.10	0.19
Persev.	0.17	**0.36**	*0.35*	**0.28**	0.21	*0.41*	0.19	0.22	0.24	0.24	0.32	0.28	0.23
Indep.	0.13	0.25	0.25	0.16	0.23	0.40	0.28	0.09	0.21	0.21	0.20	0.18	0.23
SocSkPeers	0.11	0.25	0.25	*0.23*	0.20	0.33	0.26	-0.04	0.30	0.30	0.21	0.30	0.24
SocSkAdults	0.20	0.21	0.20	0.15	**0.34**	0.39	0.24	0.06	0.20	0.24	0.17	0.17	0.19
Communication	**0.27**	0.18	0.16	0.12	*0.31*	**0.42**	0.32	0.19	0.24	0.29	0.26	0.23	0.28
Maths	0.17	0.25	0.25	0.15	0.09	0.35	**0.54**	0.26	*0.51*	**0.53**	*0.42*	**0.55**	**0.45**
FineMotor	0.17	0.14	0.16	-0.01	0.10	0.20	0.25	*0.36*	0.15	0.21	0.18	0.25	0.25
Motor	0.12	0.16	0.18	0.08	0.15	0.20	0.22	**0.39**	0.13	0.16	0.19	0.18	0.23
EarlyLiteracy	0.14	0.24	0.30	0.22	0.16	0.35	0.42	0.15	0.45	0.42	0.38	0.40	0.40
E.Lit.Read	0.13	0.17	0.23	0.21	0.12	0.28	0.36	0.10	0.37	0.34	0.34	0.35	0.36
E.Lit.Write	0.09	*0.31*	**0.38**	0.09	0.20	0.29	*0.49*	**0.39**	**0.54**	*0.52*	**0.43**	*0.49*	0.33
LogPrSolving	**0.27**	0.21	0.17	0.13	0.17	0.21	0.33	0.19	0.27	0.35	0.18	0.28	0.33

Table 6

Predictability Indices for the Capacity of each of the age 5 Competencies to act as a Precursor for Age 6 Competency

Age 6 → Age 5 ↓	Cur	Per	Ind	SSP	SSA	Com	Maths	FMS	Burt	InvSp	LPS
Curiosity	**0.29**	0.20	0.09	0.13	**0.31**	0.28	0.16	0.14	0.06	0.15	0.20
Persev.	0.18	0.29	0.16	**0.27**	0.21	0.19	0.26	0.26	0.27	0.25	0.18
Indep.	0.23	0.14	0.11	0.25	0.23	0.23	0.20	0.06	0.21	0.26	0.06
SocSkPeers	0.07	0.27	*0.21*	0.20	0.11	0.19	0.24	0.01	0.29	0.19	0.03
SocSkAdults	*0.28*	0.18	0.12	0.22	0.25	0.23	0.17	0.01	0.23	0.22	0.09
Communication	0.27	0.19	0.06	0.25	*0.28*	*0.35*	0.32	0.08	0.27	0.28	0.25
Maths	0.26	*0.33*	0.19	0.24	0.24	**0.38**	**0.71**	0.25	**0.67**	**0.57**	**0.32**
FineMotor	0.14	0.29	0.13	0.14	0.14	0.26	0.21	**0.32**	0.24	0.25	0.16
Motor	0.21	0.28	0.16	0.17	0.17	0.25	0.19	0.30	0.18	0.24	0.19
EarlyLiteracy	0.12	0.31	0.12	0.17	0.21	0.28	*0.48*	0.04	*0.53*	*0.43*	0.22
E.Lit.Read	0.10	0.23	0.08	0.13	0.17	0.21	0.43	0.01	0.43	0.41	0.26
E.Lit.Write	0.19	**0.38**	**0.26**	0.18	0.23	*0.35*	0.39	*0.27*	0.50	0.38	0.19
LogPrSolving	0.26	0.32	0.10	*0.26*	0.18	0.28	0.30	0.22	0.28	0.32	*0.29*

Table 7

Predictability Indices for the Capacity of each of the age 6 Competencies to act as a Precursor for Age 8 Competency

Age 8 → Age 6 ↓	Cur	Per	Ind	SSP	SSA	Com	Maths	FMS	PAT	Burt	Write	ReadAge	LPS
Curiosity	0.25	0.11	0.08	0.02	0.19	0.25	0.35	0.09	0.27	0.27	0.22	0.24	0.20
Persev.	0.24	*0.37*	0.39	0.24	0.29	0.32	0.37	0.12	0.35	0.37	0.25	0.38	0.30
Indep.	0.16	*0.37*	0.40	0.32	0.33	0.35	0.29	0.09	0.29	0.27	0.21	0.24	0.22
SocSkPeers	0.13	**0.38**	**0.43**	0.28	**0.38**	0.36	0.33	0.18	0.32	0.27	0.15	0.23	0.27
SocSkAdults	0.15	0.21	0.26	0.13	0.27	0.28	0.33	0.12	0.26	0.27	0.26	0.25	0.21
Communication	0.32	0.34	0.39	0.22	0.35	**0.47**	0.53	0.23	0.48	0.45	0.42	0.46	0.41
Maths	0.22	0.30	0.31	0.19	0.15	0.38	*0.60*	**0.28**	0.50	0.57	0.43	0.55	**0.50**
FineMotor	0.12	0.21	0.22	0.05	0.08	0.13	0.25	0.24	0.24	0.20	0.14	0.27	0.16
Burt	0.12	0.32	0.37	0.19	0.21	0.42	**0.61**	0.23	**0.60**	**0.79**	**0.54**	**0.69**	0.43
Inv.Spelling	0.25	0.25	0.28	0.20	0.12	0.34	0.50	0.25	0.55	0.73	0.45	0.65	0.37
LogPrSolving	0.13	0.12	0.08	0.12	0.14	0.10	0.45	0.18	0.27	0.28	0.17	0.34	0.43

APPENDIX 2

Summary Tables of One-factor analyses of the associations between factors and children's competencies

The tables below show the results of the one-factor analyses. Overall, each table describes the sorts of things that appear to underpin the given competency measure. Each line of the table describes a single-factor analysis, so the percentage of the variance accounted for in the last position on each line just applies to each one-factor analysis. No combined analysis is implied. We do not attempt in these tables to say which factors may be considered as more important than others in whatever sense, nor which appear to replace others when included in a model together. Some caution is needed in using this material, since there is considerable overlap between the socioeconomic factors.

The following set of tables give the summaries for the PAT Reading Score, Mathematics, Perseverance, Individual Responsibility and Communication.

Table 1

PAT Reading Score—Factors Showing a Very Large Impact

Factor in order of association by size of largest observed significant sub-group difference	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest observed difference	s.e[95] of given difference	percent variance explained by each factor in 1-factor model[96]
Teacher view of child's overall progress	v.low, < average & av-med.	av but good in some areas	very good/ excellent	37.8	2.7	32.0
Maternal qualification	none	mid.school to trade	Tertiary or university	26.0	3.3	12.9
ECE Type	A'oga Amata	FDC or Kindergarten or Private	Community child care or Playcentre	25.5	7.6	3.0
Extended Family Contact	none	small irregular or large regular	small regular or large irregular	22.7	8.2	3.2
Child reads at home	no		yes	22.5	5.1	3.6
Child enjoys reading	no	qualified yes	yes	21.6	3.2	10.7
Amount of Parent TV watching	4 or more hours daily	up to 3 hours daily	none	21.1	6.3	5.5
Main caregiver belongs conservation organisation.	no		yes	21.1	7.8	1.4
Child has favourite TV programme	yes		no	21.0	6.2	2.2
Family Activities - making things	no		yes	19.8	7.4	1.4
Parental view of child's overall progress	not satisfied	satisfied with reservation	satisfied	19.5	3.8	5.0
Child's health at age 8	fair to bad	good/OK	excellent/ very good	19.3	7.9	1.7
Amount of TV child watched at age 5	> 2 hours		less than 2 hours	19.2	6.7	4.9
School SES	low-middle	low	middle-class & wide	18.8	3.6	8.1
Family Income - age 5	up to $30K	$30K to $60K	> $60K	18.4	2.8	8.7
Amount of TV child watched at age 6	> 2 hours		less than 2 hours	18.4	7.4	4.6
School Decile	1 to 2	3 to 6	7 to 10	18.1	3.5	5.9
Amount of TV child watches - age 8	> 3hours	1 to 3 hours	less than 1 hour	18.1	6.6	3.9

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[95] s.e. refers to the standard error of the difference between the levels given so the significance of that difference can be assessed. As a rough guide, the more times the largest observed difference made by a factor to children's scores can be divided by the s.e., the higher the statistical significance, i.e. the likelihood that this association between factor and competency would be found in the population, and has not occurred by chance.

[96] Figures in this column relate to the individual factors analysed separately; the column does not represent the result of a regression analysis where each factor contributes an additional amount to the same variance, with no more than 100 percent variance explained. (In fact it is possible only in controlled experiments of a physical nature to come even close to explain 100 percent of the variance, or spread of the data observed. In human and social research, natural variation is at play, considerably reducing the amount of variance which may be explained). We include this column so that a comparison between different factors can be made.

Table 2

PAT Reading Score—Factors Showing a Large Impact

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variate account for in 1-factor model
Mother's Occ. at birth of 1st child	unskilled	skilled	professional	17.5	4.5	7.3
Mother's Occ. when child age 8	unskilled	skilled	professional	17.3	3.2	7.8
ECE was "print-saturated" environment	LQ[97] of score	from LQ to UQ of score	UQ of score	17.2	4.4	7.0
English as 1st or 2nd language	second		first	17.0	4.8	2.4
Child copies only	yes		no	16.9	5.8	1.6
Main caregiver belongs to arts-performing organisation	no		yes	16.7	5.0	2.1
Child reads homework books only	yes		no	16.6	4.0	3.2
Father's Occ. at birth of 1st child	unskilled	skilled	professional	16.6	4.7	6.0
Child played board games -age 6	no		yes	16.5	4.2	5.3
Child read library books at age 6	no		yes	16.3	3.1	8.9
Family Income - age 8	up to $60K		> $60K	16.0	3.2	7.6
Child's Ethnicity	Pacific Island	Māori	Pakeha or Asian	15.9	4.3	4.0
Main caregiver belongs to professional organisation	no		yes	15.0	6.4	1.0
Source of family income	DPB & other benefits		wages, self. empl & both	14.7	4.9	2.6
Father's Occ. when child aged 8	unskilled or skilled		professional	14.4	3.5	5.8
Child's perception of class - Difficulty	high to medium		low	14.0	4.9	3.5
Child's perception of class - Overall	highest quartile group	2nd & 3rd quartile groups	lowest quartile group	13.9	2.7	5.4
% income on housing - age 5	more than 50%	33% to 50%	up to 25%	13.9	5.1	4.3
Child uses public library - age 8	no		yes	13.8	2.8	4.7
Change in Family Income 5 to 8	up to $30K as is or increased		> $30K moving in any direction	13.8	3.3	5.5
ECE Staff were responsive	up to median level	3rd quartile responsiveness	UQ responsiveness	13.8	3.5	6.2
ECE Staff-Child Interaction	1st & 2nd quartile grp.	3rd quartile group	4th quartile grp.	13.8	3.7	5.4
School Type	state & state integrated		private	13.5	4.3	1.9
ECE Socioeconomic mix	low-middle, wide & low		middle-class	13.5	4.4	7.2
Child reads fiction	no		yes	12.9	2.6	4.4
Child uses halves & quarters	no		yes	12.6	2.3	5.7
Child writes long stories	no		yes	12.2	2.4	4.9

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[97] LQ=lowest quartile, UQ=upper quartile.

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variate account for in 1-factor model
ECE staff gave guidance in context	lowest quartile of guidance level measure	LQ to UQ	upper quartile of guidance level measure	11.9	3.8	3.6
Child's perception of class - Cohesion	high	medium	low	11.7	2.4	4.1
Parental homework help - provision of resources	no		yes	11.5	3.2	2.4
Parent reads to child	1-2 times/wk to daily	rarely	child does own	11.4	3.0	4.2
ECE staff joined children in their play	below the UQ		upper quartile	11.3	4.4	3.6
Family Type at age 5	sole		two-parent	10.9	3.8	3.0
Family Activities - Literacy-related	no		yes	10.8	2.6	3.3
Computer in home at age 8	no		yes	10.7	2.1	2.1
Child can tell time	no		yes	10.7	2.2	4.3
Arts lessons outside of school	no		yes	10.6	2.1	4.7
Child used CD Roms	no		yes	10.5	3.4	2.5
Number of books in house	few		many	10.5	4.5	1.9
% income on housing - age 8	>50%	33 to 50%	up to 25%	10.4	3.8	2.0
Family Activity - aesthetic/creative	no		yes	10.3	3.4	1.7
Family Type across time of study	sole all of the time	sole some of the time	two-parent all of the time	10.0	4.6	2.0

Table 3

PAT Reading Score—Factors Showing a Moderate Impact.

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variance accounted for in 1-factor model
Family Activities - Animals	no		yes	9.9	3.4	1.6
Help with homework - reading	yes		no	9.7	2.0	4.5
Parent Involvement in school	no		yes	9.7	3.4	1.5
Child writes reports	no		yes	9.6	1.9	4.5
Number of books read by child in a month	up to 3		4 or more	9.2	3.0	2.6
Child knew certain sounds matched letters at age 5	no		yes	9.1	3.1	3.0
Child has lessons outside of school	no		yes	8.9	1.9	4.0
Child adds money correctly	no		yes	8.9	2.5	2.3
Parental frequency of reading Newspaper	not daily		daily	8.9	3.6	2.2
Family Activity - physical	no		yes	8.7	2.9	1.7
ECE staff asked open-ended questions	lowest quartile		above LQ	8.6	3.1	3.0
Family Activities - not much	yes		no	8.5	4.2	0.8
ECE Starting Age	>24 months		up to 24 mths	8.4	2.9	2.4
Computer used for graphics	no		yes	8.2	2.6	2.5
Child measures length/height	no		yes	7.5	2.2	2.1
Child uses computer for word processing	no		yes	7.5	2.4	2.5
Computer in home at age 5	no		yes	7.4	2.6	2.7
Child's perception of class - Competitiveness	high		low to medium	7.4	2.8	1.4
Child writes poems	no		yes	7.3	2.0	2.4
Parent school involvement - meetings and functions	no		yes	7.3	3.6	0.8
Class level	year 3		year 4	7.2	2.0	2.5
Family Activities - Maths/science-related	no		yes	7.2	3.1	1.0
School Roll	190 to 352		<190 or >352	7.0	2.9	2.0
Child knows times tables up to 10	no		yes	6.8	2.1	2.0
Child writes letters	no		yes	6.8	2.5	1.4
Child uses calculator to multiply/divide	no		yes	6.7	1.9	2.2
Child's perception of class - Friction	high		low to med.	6.7	2.5	1.4
Gender	male		female	6.6	1.9	2.2
Child uses computer for graphics	no		yes	6.6	2.5	1.9
Child has sports lessons outside of school	no		yes	6.5	2.2	1.7
Parental aspirations for child's education - as far as child wants	yes		no	6.4	1.9	2.1
Child plays instrument or participates in musical group	no		yes	6.4	2.0	2.0
Family Type at age 8	sole		two-parent	6.2	2.7	1.0
Child keeps journal/diary	no		yes	6.1	2.0	1.7
Child uses calculator to add & subtract	no		yes	6.1	2.4	1.2
Parental homework help - supervision	no		yes	6.1	2.5	1.1
Teacher's years of teaching	up to 2 years	>2 to 17 yrs	> 17 yrs	6.0	2.1	1.7
Class does multiple choice tests	no		yes	6.0	2.2	1.4

Table 4

Mathematics Score—Factors Showing a Very Large Impact

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variance accounted for in 1-factor model
Teacher view of child's overall progress	v.low & <average	av-med & average but good in some areas	very good/excellent	50.3	8.5	35.1
Child's health at age 8	fair to bad	good/OK	excellent/very good	26.0	8.1	3.0
Maternal qualification	up to mid-school	senior school to tertiary	university	25.8	3.4	12.5
ECE Type	A'oga Amata		all other types	24.7	7.9	2.7
Father's Occ. at birth of 1st child	unskilled	skilled	professional	23.8	4.5	11.4
Amount of Parent TV watching	4 or more hrs daily	up to 3 hours daily	none	23.8	6.6	4.5
School SES	low-middle & low		middle-class & wide	21.6	3.1	9.7
School Decile	1 to 2	3 to 8	9 to 10	21.1	3.6	7.4
English as 1st or 2nd language	second		first	21.1	5.0	3.4
Mother's Occ. at birth of 1st child	unskilled	skilled	professional	20.5	4.5	8.8
Child enjoys reading	no/not really	qualified yes	yes	19.3	3.4	6.4
Amount of TV child watched - age 5	> 3 hours daily	up to 3 hours daily	none	19.0	6.7	4.8
Child's perception of class - Overall	highest quartile group	>lq and <uq	lowest quartile group	18.8	2.7	8.5
Family Income - age 5	up to $30K	$30K to $60K	>$60K	18.4	2.9	8.3
Child's Ethnicity	Māori & Pacific Island		Paheka and Asian	18.4	4.4	6.6

Table 5

Mathematics Score—Factors Showing a Large Impact

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variance accounted for in 1-factor model
Child's perception of class - Difficulty	high	medium	low	17.8	5.1	5.7
Main Caregiver belongs conservation organisation	no		yes	17.8	8.2	0.9
Child read library books at age 6	no		yes	17.7	3.1	10.6
Child played board games at age 6	no		yes	17.3	4.2	5.9
Child reads homework books only	yes		no	16.9	4.2	3.1
Parental view of child's overall progress	not satisfied		satisfied & satisfied with reservations	16.8	4.0	3.4
Child reads at home	no		yes	16.5	5.4	1.8
Child adds money correctly	no		yes	16.3	2.6	7.2
Amount of TV child watches - age 8	>3hours	1 to 3 hours	less than 1 hr	16.1	6.9	4.0
ECE SES mix	low-middle, wide & low		middle-class	15.9	3.0	11.3
Mother's Occ. when child aged 8	unskilled	skilled	professional	15.9	3.2	6.3
Child copies only	yes		no	15.9	6.0	1.3
Child uses ½ and ¼	no		yes	15.5	2.3	7.9
Family Income - age 8	up to $60K		>$60K	15.3	3.3	6.2
Main Caregiver belongs to arts-performing organisation.	no		yes	15.2	5.2	1.6
Number of books in house	few		many	14.7	4.7	3.5
% Income on housing - age 8	>50%	33% to 50%	up to 25%	14.3	3.9	3.8
Father's Occ. when child aged 8	unskilled & skilled		professional	14.1	3.5	6.6
Source of family income	DPB & other benefits		wages, self-empl & both	14.0	4.9	2.0
Class Turnover	more than 25%		few	13.9	6.5	1.2
Change in Family Income 5 to 8	up to $30K as is or increased		>$30K moving in any direction	13.8	2.8	5.8
Child uses public library - age 8	no		yes	13.7	2.9	4.2
ECE length	<36 months	36-47 months	48 months or more	13.3	3.5	6.2
Child has favourite TV programme	no		yes	13.1	6.5	0.8
Child can tell the time	no		yes	12.7	2.3	5.7
Amount of TV child watched - age 6	>2 hours		less than 2 hours	12.6	6.1	3.6
Child's perception of class - Cohesion	high		low to medium	11.8	2.5	4.7
ECE staff joined children in their play	up to 3rd quartile of score		4th quartile group	11.8	3.8	3.7
Computer in home at age 8	no		yes	11.7	2.2	5.3
% Income on housing - age 5	33% or more		up to 25%	11.6	3.8	4.5
Child enjoys numbers	no or qualified yes		yes	11.3	3.1	3.0
ECE staff were responsive	up to median level		above median level	11.0	3.5	4.3
Arts Lessons outside of school	no		yes	10.6	2.2	4.3

Table 6

Mathematics Score—Factors Showing a Moderate Impact

Factor in order of association by size of largest observed significant sub-group difference	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variance accounted for in 1-factor model
Child measures length/height	no		yes	9.9	2.3	3.4
ECE Staff-Child Interaction	1st & 2nd quartile grp.		3rd & 4th quartile grp.	9.9	3.7	3.5
ECE staff gave guidance	up to median of guidance level measure	3rd quartile group	4th quartile group	9.9	3.9	2.9
Teacher's years of teaching	up to 2 years		>2years	9.8	2.9	2.6
Child uses CD Roms	no		yes	9.7	3.3	2.2
Child writes reports	no		yes	9.6	2.0	4.2
Child plays card games	no		yes	9.6	4.5	0.8
Number of books read by child in a month	up to 3	3 to 6	>6	9.5	3.1	2.4
Parental education aspirations for child - Tertiary	no		yes	9.4	2.0	4.1
Child uses computer for graphics	no		yes	9.3	2.4	4.0
Computer in home at age 5	no		yes	9.3	2.6	4.4
Child reads fiction	no		yes	9.1	2.8	2.0
Family Activities - Literacy-related	no		yes	8.8	2.7	2.0
Parental Involvement in school	no		yes	8.8	3.5	1.2
Class does multiple choice tests	no		yes	8.5	2.3	2.6
Child knew sound-letter relationship at age 5	no		yes	8.2	3.1	2.5
Family Activity - aesthetic/creative	no		yes	8.1	3.5	1.0
School Roll	190+ to 261	others	352+	7.9	3.0	1.6
Child uses calculator to multiply/divide	no		yes	7.7	2.0	2.7
Child uses calculator to add/subtract	no		yes	7.5	2.5	1.7
ECE Starting Age	>24 months		up to 24 months	7.5	2.8	2.1
Computer in home at age 6	no		yes	7.4	2.6	2.8
Parental frequency of reading newspaper	not at all		daily	7.2	2.4	1.9
Child plays instrument or participates in musical group	no		yes	7.1	2.0	2.3
% ESL in classroom	>11%		up to 11%	7.1	2.4	1.7
Child's perception of class - Friction	high		low to medium	7.1	2.6	1.4
Partner belongs to sports organisations	no		yes	6.9	2.3	2.1
Child uses computer for word processing	no		yes	6.7	2.3	2.3
Family Activity - physical	no		yes	6.6	3.1	0.9
Child writes long stories	no		yes	6.5	2.5	1.3
Parental homework help - provision of resources	no		yes	6.5	3.4	0.7
Household size at age 8	6 or more		up to 5	6.2	2.5	1.3
Child does word puzzles	no		yes	6.1	2.4	1.3

Table 7

Perseverance Score—Factors Showing a Very Large Impact

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variance accounted for in 1-factor model
Teacher view of child's overall progress	v.low & < average	av-med & av but gd in some areas	very good/ excellent	73.1	6.8	42.6
School Attendance	poor	satisfactory	good	27.4	8.7	2.8
Child copies only	yes		no	21.6	5.3	3.0
Parental view of child's overall progress	not satisfied	satisfied with reservation	satisfied	20.3	3.6	7.8

Table 8

Perseverance Score—Factors Showing a Large Impact

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variance accounted for in 1-factor model
Child enjoys reading	no or qualified yes		yes	15.5	3.1	5.9
Child enjoys writing	no		yes	14.7	2.4	7.0
% family income on housing - age 5	more than 50%	33% to 50%	up to 25%	13.9	4.8	4.2
Parent reads to child	3-4 times a week	(remaining results not clear)	child does own	13.5	3.5	2.8
Partner organisation membership	no		yes	13.1	4.9	1.6
Child reads homework books only	yes		no	13.0	3.8	2.2
Child read library books at age 6	no		yes	12.9	3.0	6.1
Parental view of child's progress at age 6	not satisfied		satisfied to sat. with reservation	12.7	5.1	2.3
Family Activities - School-related	yes		no	12.6	5.8	0.9
Class size in 3 levels	>30	21 to 30	<21	12.4	5.7	1.3
Father's Occ. at birth of 1st child	unskilled		skilled or professional	11.9	4.5	3.1
Child plays board games at age 8	no		yes	11.8	5.1	1.0
Family Income - age 8	up to $20K	<$20K - $60K	>$60K	11.6	3.1	3.4
ECE - children can complete activities	CCA up to 4.9		CCA >4.9	11.3	3.6	3.6
Amount of Parent TV watching	>3 hours		up to 3hrs	11.1	4.6	2.7
Number of books read by child in a month	up to 3	4 or 5 (or claiming >14)	6 to 14	10.8	2.8	3.2
English as 1st or 2nd language	second		first	10.4	4.6	1.0
Father's Occ. when child aged 8	unskilled		skilled or professional	10.3	3.4	2.2
Gender	male		female	10.2	1.8	5.8

Table 9

Perseverance Score—Factors Showing a Moderate Impact

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% varian accounted in 1-facto model
ECE was "print-saturated" environment	LQ of score		above LQ of score	9.9	3.4	3.9
Child writes long stories	no		yes	9.8	2.3	3.4
Change in Family Income 5 to 8	up to $30K as is or incr., or any income going down		> $30K as is or going up	9.7	3.2	3.2
Family income - age 5	up to $30K		> $30K	9.4	2.8	2.9
Class size in 3 levels	> 30	up to 28	28-30	9.3	3.1	1.8
Family type at age 5	sole		two-parent	9.1	3.6	2.3
Family activities - not much	yes		no	9.0	4.1	0.9
Child played board games at age 6	no		yes	8.8	4.0	1.7
Child adds money correctly	no		yes	8.7	2.4	2.4
Child can tell time	no		yes	8.6	2.1	3.0
Child uses ½ & ¼	no		yes	8.6	2.2	2.9
Child plays card games	no		yes	8.6	4.2	0.8
Parental involvement in school	no		yes	8.5	3.2	1.3
Child uses calculator to add/subtract	no		yes	8.4	2.3	2.5
Child writes poems	no		yes	8.2	1.9	3.3
Maternal qualification	up to snr. school		trade, tertiary or univ	8.2	2.9	2.6
Teacher's years of teaching	up to 17 years		> 17 years	8.1	2.7	1.8
Child writes reports	no		yes	8.0	1.9	3.3
School SES	low or low-middle		wide or middle-class	7.7	3.0	1.8
Child does word puzzles	no		yes	7.5	2.2	2.3
% Family income on housing - age 8	more than 25%		up to 25%	7.4	3.6	2.1
Child's perception of class - Overall	highest quartile group		less than top quartile group	7.3	2.7	1.7
Family activity - physical	no		yes	7.3	2.8	1.2
Child keeps journal/diary	no		yes	7.2	1.9	2.6
Child uses computer for word processing	no		yes	7.2	2.3	2.5
Child uses computer for graphics	no		yes	6.8	2.3	2.4
Child writes plays	no		yes	6.7	2.7	1.2
Child writes letters	no		yes	6.6	2.4	1.4
Family activities - Literacy-related	no		yes	6.6	2.5	1.3
Child uses CD Roms	no		yes	6.6	3.2	1.1
Family type across time of study	sole all or some of the time		two-parent all of the time	6.3	3.1	1.5
Parental homework help - provision of resources	no		yes	6.1	3.1	0.7
Arts lessons outside of school	no		yes	5.9	2.1	1.6
Amount of TV child watches at age 8	more than 2 hours		up to 2 hrs	5.9	2.3	1.2
Mother's employment status	not in paid work or full-time		part-time	5.6	2.2	1.2
Child writes short stories	no		yes	5.4	1.9	1.5
Child measures length/height	no		yes	5.4	2.1	1.2
Child's perception of class - Difficulty	medium to high		low	5.3	1.9	1.5

Table 10

Individual Responsibility Score—Factors Showing a Very Large Impact

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variance accounted for in 1-factor model
Teacher view of child's overall progress	v.low & < average	av-med & av but good in some areas	very good/excellent	61.1	6.8	32.0
School attendance	poor		satisfactory or good	22.7	8.0	1.7

Table 11

Individual Responsibility Score—Factors Showing a Large Impact

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variance accounted for in 1-factor model
Parental view of child's overall progress	not satisfied	satisfied with reservation	satisfied	17.9	3.4	6.0
Child copies only	yes		no	17.6	4.9	2.4
Child enjoys writing	no		yes	15.9	2.2	9.5
English as 1st or 2nd language	second		first	15.7	4.2	2.6
Parental view of child's progress at age 6	not satisfied		satisfied or satisfied with reservation	15.3	4.7	3.8
Gender	male		female	15.0	1.6	14.5
Child enjoys reading	no or qualified yes		yes	13.8	2.8	5.5
Child read library books at age 6	no		yes	13.0	2.8	7.1
Partner organisation membership	no		yes	11.9	4.5	1.6
Child has favourite TV programme	yes		no	11.9	5.5	0.9
Child reads at home	no		yes	11.8	4.6	1.3
Family Income - age 5	up to $20K		> $20K	11.3	2.6	3.7
Child plays board games at age 8	no		yes	11.3	4.7	1.1
Father's Occ. at birth of 1st child	unskilled		skilled or professional	10.9	4.2	3.1
MC belongs arts performing organisation	no		yes	10.1	4.5	1.0
Family Income - age 8	up to $60K		> $60K	10.0	2.8	3.0

Table 12

Individual Responsibility Score—Factors Showing Moderate Impact

Factor in order of association by size of largest observed significant sub-group difference	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variance accounted for in 1-factor model
Family Activities - don't do much	yes		no	9.9	3.7	1.3
Number of books in house	few		many	9.9	4.0	2.2
Number of books read by child in a month	up to 3		4 or more	9.6	2.6	3.0
Child reads only homework books	yes		no	9.3	3.5	1.3
Change in Family Income 5 to 8	up to $30K as is or incr. or any income going down		>$30K as is or going up	9.0	2.9	2.9
Child belongs to arts/performing club	no		yes	8.9	2.9	1.8
School SES	low or low-middle		wide or middle-class	8.8	3.2	2.0
Child could select own activities at ECE	below UQ score		UQ of score	8.7	3.1	2.9
Child keeps journal/diary	no		yes	8.2	1.8	4.1
% family income on housing	more than 25%		up to 25%	8.0	2.6	2.6
Child writes long stories	no		yes	7.6	2.1	2.4
Maternal qualification	up to snr. school		trade, tertiary or univ	7.5	3.0	2.4
Child can tell time	no		yes	7.4	2.0	2.6
Class size	>30	up to 28	>28-30	7.4	2.9	1.6
Child writes poems	no		yes	7.3	1.8	3.1
Child uses ½ & ¼	no		yes	7.3	2.0	2.5
Child does word puzzles	no		yes	7.2	2.0	2.4
Child writes letters	no		yes	7.1	2.2	1.9
Child uses computer for word processing	no		yes	6.8	2.1	2.7
Family type at age 5	sole		two-parent	6.8	3.4	1.5
Child writes short stories	no		yes	6.6	1.7	2.7
Number of people in house	2 or 3		4 or more	6.6	3.0	1.3
Child uses calculator to add & subtract	no		yes	6.2	2.1	1.6
Child uses CD Roms	no		yes	6.2	3.0	1.1
Child writes reports	no		yes	6.1	1.7	2.3
Child writes plays	no		yes	6.1	2.4	1.2
Child plays instrument or participates in musical group	no		yes	5.9	1.7	2.1
Child uses computer for graphics	no		yes	5.7	2.1	2.0
Child has lessons outside school	no		yes	5.1	1.7	1.7
Child reads fiction	no		yes	5.0	2.4	0.9

Table 13

Communication Score—Factor Showing a Very Large Impact

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variance accounted for in 1-factor model
Teacher view of child's overall progress	v.low & < average	av-med & av but gd in some areas	very good/ excellent	46.3	5.9	38.0

Table 14

Communication Score—Factors Showing a Large Impact

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variance accounted for in 1-factor model
School attendance	poor	satisfactory	good	17.2	7.1	1.7
Parental view of child's overall progress	not satisfied	satisfied with reservation	satisfied	15.8	2.8	6.1
English as 1st or 2nd language	second		first	15.0	3.6	3.3
Father's Occ. at birth of 1st child	unskilled		skilled or professional	14.0	3.4	7.1
Source of family income	Benefit (not DPB)	DPB or wages	Self. Empl or SelfEmpl + wages	10.9	3.3	2.4
School SES	low-middle		wide or middle-class or low	10.7	2.7	3.5
Family activities - school-related	yes		no	10.7	4.7	1.0
Partner organisation membership - cultural/ ethnic	yes		no	10.6	4.9	0.9
Partner belongs to organisation	no		yes	10.4	3.4	2.1
Mother occ at birth of 1st child	unskilled		skilled or professional	10.1	3.3	3.5

Table 15

Communication Score—Factors Showing Moderate Impact

Factor in order of association by size of largest observed significant sub-group difference ↓	Factor levels with generally low performance	Factor levels with middling performance	Factor levels with generally high performance	largest obs. diff.	s.e of given diff.	% variance accounted for in 1-factor model
Child's Ethnicity	Pacific Island	Māori or Asian	Pakeha	9.9	3.2	2.3
Child uses CD Roms	no		yes	8.7	2.2	3.9
Child plays card games	no		yes	8.6	3.3	1.3
Child reads only homework books	yes		no	8.5	3.0	1.5
Child copies only	yes		no	8.4	4.1	0.8
Child uses halves & quarters	no		yes	8.1	1.7	4.2
ECE length	up to 36 months		36 months or more	8.1	2.9	3.1
School Decile	1 to 6		7 to 10	7.6	3.0	2.5
Family Income - age 5	up to $30K		>$30K	7.4	2.0	2.6
Child enjoys reading	no or qualified yes		yes	7.2	2.4	2.2
Child plays board games at age 8	no		yes	7.2	3.6	0.8
Child's perception of class - Overall	highest quartile group		less than top quartile group	7.1	1.9	2.0
Child's perception of class - Difficulty	medium to high		low	7.0	1.3	4.1
Child can tell time	no		yes	7.0	1.7	3.3
Family Income - age 8	up to $60K		>$60K	7.0	2.2	2.6
Maternal qualification	up to senior school		trade, tertiary or university	6.9	2.4	2.5
Gender	male		female	6.8	1.4	4.5
Children select own ECE activities	below UQ of score		UQ	6.7	2.4	2.8
Child writes long stories	no		yes	6.6	1.8	2.4
Family activities - not much	yes		no	6.6	3.0	0.9
Child read library books at age 6	no		yes	6.5	2.1	3.2
Mother's Occ. when child aged 8	unskilled		skilled or professional	6.5	2.2	2.7
Child uses public library - age 8	no		yes	6.4	2.0	2.1
Parental Involvement in school	no		yes	6.2	2.7	1.3
Child enjoys writing	no		yes	6.0	1.8	2.0
Family Activity - physical	no		yes	6.0	2.1	1.6
Change in Family Income 5 to 8	up to $30K as is or incr. or any income going down		>$30K,as is or going up	5.9	2.7	2.3
Teacher's prof. development own time - Post-graduate	no		yes	5.9	3.0	0.7
Teacher's prof. development own time - B Ed	no		yes	5.8	2.9	0.8
Arts lessons outside of school	no		yes	5.6	1.5	2.6
Teacher's years of teaching	up to 2 years	>2 to 17 years	> 17 years	5.6	1.9	1.8
Child writes poems	no		yes	5.4	1.5	2.4
Child belongs to arts/performing club	no		yes	5.4	2.3	1.1
Computer ownership at age 8	no		yes	5.3	1.6	2.1
Child uses calculator to add & subtract	no		yes	5.3	1.9	1.6
Child writes reports	no		yes	5.0	1.5	2.2